A non-monotone trust-region algorithm for nonlinear optimization subject to convex constraints: the complete numerical results

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Abstract

This report presents the complete numerical results discussed in the companion paper Toint (1994) on a proposal for a non-monotone trust-region optimization algorithm. The present report therefore only consists of tables, in which these detailed results can be found, while their introduction and discussion is entirely presented in Toint (1994).

In this paper, we report the complete numerical results discussed in the companion paper Toint (1994) on a proposal for a non-monotone trust-region optimization algorithm. These methods are distinguished by the fact that they do not enforce strict monotonicity of the objective function values at successive iterates. Extensive numerical experiments show that this approach is competitive with the LANCELOT package. The purpose of this paper is to detail the complete results of these experiments. It therefore only consists of tables, in which these detailed results can be found, while their introduction, motivation and discussion is entirely presented in Toint (1994).

1 Corrections to exit conditions

In the course of the experiments with SBMIN (LANCELOT) and non-monotone algorithms, it was observed that, in a few cases, an algorithm reported failure to converge, while it had in fact converged to a solution coherent with that found by other methods. These runs were thus reinterpreted as successful ones and the corresponding exit codes, i.e. the codes indicating the reason for algorithm termination, were corrected (in this case, set to zero). Tables 1 and 2 indicates the corrections made and reports, for each problem and algorithm, the original diagnostic of the relevant algorithm. The entries of the tables are either "s" ot "i". The first means that the relevant algorithm reported premature termination on the relevant problem caused by too small a step. The second only appears for problem NYSTROM5, a system of nonlinear equations, and indicates that the relevant algorithm reported stopping without finding a root.

In the same tables, the three lines of column header indicate the considered algorithm. In the first line "SB" stands for SBMIN, "DXZ" for the algorithm by Deng, Xiao and Zhou, "N1"

for Algorithm NMTR1 and "N2" for Algorithm NMTR2. The type of preconditioner used is indicated in the second line: "n" stands for no preconditioner, "b" stands for the five-banded preconditioner and "f" for the full factorization preconditioner. The last header line indicates the value taken by the method parameter, when applicable: the parameter is p for NMTR1 and h for NMTR2.

problem	SB	SB	SB	DXZ	DXZ	DXZ	N1	N1	N1	N1
	n	b	f	n	b	f	b	b	b	b
							5	10	15	20
CATENARY					s	s				
CHEMRCTA							s			
CHEMRCTB					s			s	s	s
HEARTLS	s									
HS75		s	s	s	s	s	s	s	s	s
HS114					s					
MEYER3			s				s		s	s
NYSTROM5		i			i	i	i	i	i	i
TENBARS1					s	s		s		s
TENBARS2									s	
SSEBNLN					s					
TRUSPYR1					s			s	s	
VARDIM($n = 5000$)	s	s	s	s	s	s	s	s	s	s

Table 1: Corrections to exit conditions (Part 1)

problem	N1	N1	N1	N1	N1	N2	N2	N2	N2	N2
	b	b	b	b	b	n	b	f	b	b
	25	30	35	40	∞	5	5	5	10	15
CHEMRCTB	s	s	s	s	s	s	s	s	s	s
HEARTLS		s	s		s		s		s	s
HS75	s	s	s	s	s	s	s	s	s	s
MEYER3	s									
NYSTROM5	i	i	i	i	i		i		i	i
TENBARS1			s	s			s			s
TENBARS2			s		s				s	
ORTHREGA						s				
ORTHREGC							s		s	s
PRODPL1				s						
TRUSPYR1		s	s	s					s	s
VARDIM($n = 5000$)	s	s	s	s	s		s		s	s

Table 2: Corrections to exit conditions (Part 2)

2 The detailed results

We present, in the pages that follow, the complete results obtained in the course of the research work reported by Toint (1994).

We now describe the various heading and keywords used in the tables.

n: the problem's size,

iters: the number of iteration required for solution,

evals: the number of function evaluations required for solution,

CG-its: the number of (modified) conjugate gradients steps cumulated

CPU: the CPU time (in seconds on a DEC 3000/500 under OSF and using version 3.3-35 of the f77 compiler with default options, rounded to the tenth of a second),

value: the value of the objective function found at the algorithm's termination,

exit: the exit condition code, for which a nonzero value indicates abnormal termination (in particular, the exit code 6 indicates that execution was terminated due to an arithmetic error, or when the time limit of 18000 seconds was exceeded),

DXZ: the algorithm of Deng, Xiao and Zhou.

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	10	11	21	0.29	5.7444	0
ARWHEAD	100	5	6	9	0.20	0	0
ARWHEAD	500	5	6	7	0.40	1.3224e-09	0
BARD	3	13	14	44	0.36	0.0082149	0
BDQRTIC	100	12	13	68	0.46	378.77	0
BDQRTIC	500	12	13	78	1.01	1981	0
BEALE	2	5	6	12	0.16	6.2362e-16	0
BIGGS6	6	19	20	78	0.55	0.0056557	0
BOX3	3	7	8	21	0.22	1.641e-09	0
BRKMCC	2	4	5	9	0.14	0.16904	0
BROWNAL	10	4	5	10	0.14	1.1263e-10	0
BROWNBS	2	24	25	53	0.67	0	0
BROWNDEN	4	11	12	35	0.33	85822	0
BROYDN7D	10	21	22	99	0.58	1.2611	0
BROYDN7D	100	21	22	111	0.71	39.355	0
BROYDN7D	500	76	77	312	3.91	189.27	0
BRYBND	10	11	12	81	0.34	5.0386e-17	0
BRYBND	100	10	11	110	0.48	4.9725e-13	0
BRYBND	500	10	11	119	1.23	5.2269e-13	0
CHNROSNB	10	36	37	203	0.94	1.2635e-15	0
CLIFF	2	28	29	34	0.77	0.19979	0
CRAGGLVY	100	13	14	177	0.56	32.27	0
CRAGGLVY	4	17	18	67	0.47	4.2291e-08	0
CRAGGLVY	500	13	14	179	1.24	167.45	0
CUBE	2	42	43	113	1.10	6.0059e-12	0
DENSCHNA	2	5	6	11	0.17	6.6698e-14	0
DENSCHNB	2	5	6	8	0.17	7.604e-16	0
DENSCHNC	2	9	10	17	0.27	8.7828e-13	0
DENSCHND	3	28	29	89	0.76	1.0203e-07	0
DENSCHNE	3	16	17	23	0.43	1.3646e-12	0
DENSCHNF	2	6	7	16	0.19	2.8929e-18	0
DIXMAANA	15	6	7	14	0.14	1	0
DIXMAANA	90	5	6	14	0.15	1	0
DIXMAANA	300	5	6	14	0.25	1	0
DIXMAANB	15	6	7	19	0.13	1	0
DIXMAANB	90	6	7	20	0.18	1	0
DIXMAANB	300	6	7	19	0.28	1	0
DIXMAANC	15	7	8	21	0.16	1	0
DIXMAANC	90	7	8	21	0.20	1	0
DIXMAANC	300	7	8	22	0.32	1	0
DIXMAAND	15	8	9	25	0.18	1	0
DIXMAAND	90	8	9	25	0.21	1	0

Table 3: Unpreconditioned SBMIN on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	8	9	26	0.34	1	0
DIXMAANE	15	7	8	36	0.16	1	0
DIXMAANE	90	8	9	69	0.23	1	0
DIXMAANE	300	8	9	117	0.46	1	0
DIXMAANF	15	10	11	43	0.21	1	0
DIXMAANF	90	13	14	83	0.35	1	0
DIXMAANF	300	14	15	128	0.71	1	0
DIXMAANG	15	11	12	49	0.22	1	0
DIXMAANG	90	16	17	87	0.41	1	0
DIXMAANG	300	12	13	122	0.65	1	0
DIXMAANH	15	12	13	48	0.25	1	0
DIXMAANH	90	14	15	86	0.36	1	0
DIXMAANH	300	18	19	148	0.82	1	0
DIXMAANI	15	7	8	62	0.16	1	0
DIXMAANI	90	7	8	295	0.33	1	0
DIXMAANI	300	7	8	969	1.78	1	0
DIXMAANJ	15	12	13	84	0.25	1	0
DIXMAANJ	90	21	22	567	0.77	1	0
DIXMAANJ	300	28	29	811	2.23	1	0
DIXMAANK	15	12	13	66	0.25	1	0
DIXMAANK	90	17	18	213	0.49	1	0
DIXMAANK	300	23	24	595	1.73	1	0
DIXMAANL	15	12	13	69	0.25	1	0
DIXMAANL	90	20	21	243	0.56	1	0
DIXMAANL	300	20	21	548	1.57	1	0
DIXON3DQ	10	3	4	27	0.12	5.3002e-31	0
DJTL	2	62	63	98	1.56	-8951.5	0
DQDRTIC	10	2	3	2	0.09	1.6602e-23	0
DQDRTIC	100	2	3	2	0.12	1.6602e-23	0
DQDRTIC	500	2	3	2	0.26	1.6602e-23	0
DQRTIC	100	26	27	116	0.82	4.9878e-07	0
DQRTIC	500	33	34	195	1.77	6.084e-07	0
EDENSCH	36	13	14	46	0.40	219.28	0
EIGENALS	110	15	16	157	0.90	2.7564e-11	0
EIGENALS	420	25	26	406	9.61	1.1461e-09	0
EIGENBLS	110	155	156	3171	16.47	6.5593e-10	0
EIGENBLS	420	272	273	10888	369.63	9.7298e-09	0
EIGENCLS	462	105	106	3384	136.44	3.8743e-11	0
ENGVAL1	100	7	8	27	0.27	109.09	0
ENGVAL1	2	7	8	17	0.20	0	0
ERRINROS	10	74	75	504	1.94	6.6946	0
ERRINROS	50	74	75	808	2.23	39.904	0

Table 4: Unpreconditioned SBMIN on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	25	0.36	0.24051	0
EXTROSNB	5	75	76	390	1.96	2.1612e-11	0
FLETCBV2	100	1	2	101	0.15	-0.51401	0
FLETCBV3	100	10000	10001	18393	316.12	-3129.8	1
FLETCHBV	10	424	425	993	10.85	-2.1247e+06	0
FLETCHBV	100	10000	10001	19988	289.41	-3.1435e+11	1
FLETCHCR	10	48	49	270	1.23	3.6173e-13	0
FLETCHCR	100	318	319	2339	9.49	1.9417e-14	0
FMINSURF	121	50	51	196	1.67	1	0
FMINSURF	16	15	16	51	0.42	1	0
FREUROTH	100	10	11	38	0.37	11965	0
FREUROTH	2	9	10	21	0.27	48.984	0
FREUROTH	50	10	11	38	0.33	5881	0
FREUROTH	500	10	11	38	0.68	60634	0
GENROSE	10	36	37	203	0.98	1	0
GENROSE	100	148	149	904	4.47	1	0
GENROSE	500	676	677	4242	31.98	1	0
GROWTHLS	3	183	184	617	4.76	1.004	0
GULF	3	40	41	124	1.26	9.1065e-08	0
HAIRY	2	102	103	200	1.64	20	0
HATFLDD	3	14	15	48	0.40	6.6879e-08	0
HATFLDE	3	15	16	50	0.43	5.1327e-07	0
HEART6LS	6	1410	1411	4498	35.93	1.2953e-08	0
HELIX	3	14	15	46	0.38	1.3413e-16	0
HILBERTA	2	2	3	2	0.06	6.656e-31	0
HILBERTB	5	2	3	2	0.06	1.5953e-29	0
HIMMELBB	2	20	21	22	0.55	8.0936e-13	0
HIMMELBF	4	341	342	1512	8.69	318.57	0
HIMMELBG	2	8	9	12	0.15	7.139e-13	0
HIMMELBH	2	1	2	1	0.04	-1	0
HYDC20LS	99	10000	10001	2516925	4898.24	0.17341	1
JENSMP	2	9	10	23	0.27	124.36	0
KOWOSB	4	15	16	60	0.41	0.0003078	0
LIARWHD	100	10	11	28	0.36	1.2325e-15	0
LIARWHD	36	10	11	26	0.33	4.3062e-17	0
LIARWHD	500	11	12	29	0.65	4.4222e-19	0
LOGROS	2	54	55	116	1.40	0	0
MANCINO	100	11	12	24	11.86	4.3367e-17	0
MOREBV	10	3	4	30	0.12	2.6552e-12	0
MOREBV	100	5	6	1227	0.82	6.7615e-07	0
MOREBV	500	2	3	401	1.19	9.4938e-09	0
MSQRTALS	100	21	22	495	2.23	1.8269e-10	0

Table 5: Unpreconditioned SBMIN on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	50	0.43	5.0588e-10	0
MSQRTALS	49	17	18	171	0.71	1.9122e-11	0
MSQRTBLS	100	19	20	363	1.83	2.3406e-09	0
MSQRTBLS	49	18	19	259	0.82	1.3055e-10	0
MSQRTBLS	9	12	13	46	0.33	7.4629e-12	0
NCB20B	100	29	30	984	5.63	196.68	0
NCB20B	50	11	12	253	0.71	99.504	0
NCB20B	500	28	29	1259	45.72	897.52	0
NONDIA	100	18	19	35	0.57	5.8322e-14	0
NONDIA	50	11	12	21	0.34	1.5573e-14	0
NONDIA	500	19	20	39	0.95	1.791e-19	0
NONDQUAR	100	66	67	742	2.07	8.8262e-06	0
NONDQUAR	500	80	81	893	4.19	8.5825e-06	0
NONMSQRT	100	296	297	15924	49.18	18.056	0
NONMSQRT	49	226	227	6603	12.16	1.0754	0
NONMSQRT	9	90	91	615	2.33	0.75197	0
OSBORNEA	5	60	61	279	1.63	5.4975e-05	0
OSBORNEB	11	30	31	223	1.14	0.040138	0
PALMER1C	8	74	75	1627	2.25	0.097605	0
PALMER1D	7	34	35	468	1.01	0.65267	0
PALMER2C	8	16	17	262	0.49	0.01437	0
PALMER3C	8	49	50	992	1.46	0.019538	0
PALMER4C	8	37	38	719	1.11	0.050311	0
PENALTY1	10	38	39	88	1.00	7.1191e-05	0
PENALTY1	100	49	50	100	1.45	0.00090257	0
PENALTY1	50	50	51	109	1.38	0.00043189	0
PENALTY1	500	56	57	108	3.62	0.0047789	0
PENALTY2	10	15	16	49	0.43	0.00029523	0
PENALTY2	100	18	19	168	0.74	97096	0
PENALTY2	50	34	35	151	1.03	4.2961	0
PENALTY3	100	25	26	136	20.34	0.00099994	0
PENALTY3	50	19	20	79	3.09	0.001	0
PFIT1LS	3	483	484	1473	12.22	5.7709e-07	0
POWELLSG	100	15	16	74	0.51	1.4205e-07	0
POWELLSG	500	15	16	74	0.78	7.1025e-07	0
POWELLSG	20	15	16	73	0.44	3.5465e-08	0
POWELLSG	4	15	16	72	0.41	1.1266e-08	0
POWER	10	16	17	67	0.47	3.1417e-08	0
POWER	100	22	23	207	0.76	1.4132e-08	0
POWER	50	20	21	141	0.63	2.3657e-08	0
POWER	500	26	27	453	1.80	1.0025e-08	0
QUARTC	100	26	27	116	0.83	4.9878e-07	0

Table 6: Unpreconditioned SBMIN on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	55	0.60	8.3381e-08	0
QUARTC	500	33	34	195	1.77	6.084e-07	0
ROSENBR	2	27	28	70	0.72	2.7977e-11	0
S308	2	9	10	19	0.27	0.7732	0
SCHMVETT	10	3	4	28	0.09	-24	0
SCHMVETT	500	3	4	50	0.57	-1494	0
SCHMVETT	3	3	4	11	0.08	-3	0
SCHMVETT	500	3	4	50	0.57	-1494	0
SINQUAD	100	35	36	107	1.11	5.8068e-06	0
SINQUAD	5	19	20	64	0.52	1.0628e-07	0
SINQUAD	50	26	27	82	0.76	1.0543e-06	0
SINQUAD	500	53	54	155	2.84	3.8077e-06	0
SISSER	2	12	13	17	0.35	1.3906e-08	0
SNAIL	2	92	93	243	1.54	3.1609e-20	0
SPMSRTLS	100	12	13	85	0.52	3.9581e-11	0
SPMSRTLS	28	12	13	56	0.37	6.0836e-12	0
SPMSRTLS	499	16	17	129	1.68	2.0993e-11	0
SROSENBR	10	10	11	30	0.29	6.6723e-14	0
SROSENBR	100	10	11	30	0.34	6.6723e-13	0
SROSENBR	50	10	11	30	0.31	3.3361e-13	0
SROSENBR	500	10	11	30	0.54	3.3361e-12	0
TOINTGOR	50	8	9	125	0.30	1373.9	0
TOINTGSS	10	14	15	69	0.27	10	0
TOINTGSS	100	8	9	27	0.23	10.102	0
TOINTGSS	50	12	13	41	0.25	10.208	0
TOINTGSS	500	8	9	23	0.40	10.02	0
TOINTPSP	50	38	39	123	1.07	225.56	0
TOINTQOR	50	5	6	39	0.20	1175.5	0
TQUARTIC	100	11	12	21	0.38	1.1899e-14	0
TQUARTIC	5	9	10	17	0.27	9.1239e-19	0
TQUARTIC	50	9	10	17	0.28	9.6241e-10	0
TQUARTIC	500	12	13	26	0.65	4.4191e-15	0
TRIDIA	10	5	6	29	0.18	5.687e-12	0
TRIDIA	100	4	5	95	0.22	8.5487e-14	0
TRIDIA	50	4	5	79	0.17	9.9326e-14	0
TRIDIA	500	4	5	95	0.48	8.5487e-14	0
VARDIM	10	14	15	14	0.39	1.595e-26	0
VARDIM	100	25	26	25	0.75	5.171e-26	0
VARDIM	50	22	23	22	0.64	1.2641e-27	0
VARDIM	500	33	34	33	1.31	1.1634e-25	0
VAREIGVL	10	10	11	63	0.30	4.2007e-09	0
VAREIGVL	100	11	12	92	0.45	1.5303e-08	0

Table 7: Unpreconditioned SBMIN on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	11	12	120	0.41	9.1854e-09	0
VAREIGVL	500	12	13	110	1.06	1.7608e-08	0
VIBRBEAM	8	179	180	1443	6.12	0.15645	0
WATSON	12	9	10	50	0.32	9.3046e-08	0
WATSON	31	9	10	53	0.35	3.0439e-08	0
WOODS	100	16	17	64	0.54	1.6135e-15	0
WOODS	4	16	17	56	0.44	1.7832e-17	0
WOODS	500	16	17	65	0.86	2.5478e-15	0
YFITU	3	87	88	307	2.29	8.4268e-09	0
ZANGWIL2	2	1	2	1	0.04	-18.2	0
PFIT2LS	3	278	279	898	7.02	4.035e-08	0
PFIT3LS	3	302	303	986	7.52	1.4173e-08	0
PFIT4LS	3	527	528	1644	13.43	9.4214e-09	0
EXTROSNB	10	386	387	3366	9.98	2.9972e-06	0
EXTROSNB	50	403	404	3885	11.41	2.9629e-06	0
EXTROSNB	100	408	409	3875	12.69	3.0751e-06	0

Table 8: Unpreconditioned SBMIN on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	7	0.70	1.6903e-10	0
ARWHEAD	5000	5	6	7	4.63	1.11e-12	0
BDQRTIC	1000	12	13	78	1.84	3983.8	0
BROYDN7D	1000	132	133	557	10.19	375.12	0
BRYBND	1000	13	14	190	3.25	2.8797e-13	0
BRYBND	5000	18	19	237	20.65	9.5322e-13	0
CRAGGLVY	1000	13	14	179	2.17	336.42	0
CRAGGLVY	5000	13	14	179	11.13	1688.2	0
DIXMAANA	1500	5	6	14	0.83	1	0
DIXMAANA	3000	4	5	12	1.45	1	0
DIXMAANB	1500	6	7	19	0.95	1	0
DIXMAANB	3000	6	7	19	1.81	1	0
DIXMAANC	1500	7	8	22	1.02	1	0
DIXMAANC	3000	7	8	22	1.95	1	0
DIXMAAND	1500	8	9	27	1.11	1	0
DIXMAAND	3000	8	9	26	2.11	1	0
DIXMAANE	1500	8	9	219	2.61	1	0
DIXMAANE	3000	8	9	284	6.57	1	0
DIXMAANF	1500	16	17	199	3.25	1	0
DIXMAANF	3000	16	17	242	7.13	1	0
DIXMAANG	1500	15	16	204	3.25	1	0
DIXMAANG	3000	19	20	286	8.74	1	0
DIXMAANH	1500	18	19	274	4.11	1	0
DIXMAANH	3000	19	20	304	9.20	1	0
DIXMAANI	1500	7	8	3032	25.77	1	0
DIXMAANI	3000	7	8	5640	99.24	1	0
DIXMAANJ	1500	28	29	3127	32.23	1	0
DIXMAANJ	3000	41	42	3777	81.31	1	0
DIXMAANK	1500	41	42	2159	23.37	1	0
DIXMAANK	3000	56	57	5163	110.91	1	0
DIXMAANL	1500	42	43	3429	35.70	1	0
DIXMAANL	3000	37	38	3216	69.90	1	0
DQDRTIC	1000	2	3	2	0.43	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.88	1.6602e-23	0
DQRTIC	1000	35	36	258	2.94	3.7687e-06	0
DQRTIC	5000	42	43	410	16.02	6.9762e-06	0
EDENSCH	2000	14	15	50	2.51	12003	0
EIGENALS	930	52	53	1333	98.30	6.3632e-10	0
EIGENBLS	930	302	303	14981	1746.64	1.4055e-05	0
ENGVAL1	1000	7	8	27	0.82	1108.2	0
ENGVAL1	5000	7	8	27	3.54	5548.7	0
FLETCBV2	1000	0	1	0	0.35	-0.50134	0

Table 9: Unpreconditioned SBMIN on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	10010	1034.49	-1.8877e+06	1
FMINSURF	1024	189	190	716	17.13	1	0
FMINSURF	5625	435	436	1684	191.21	1	0
FREUROTH	1000	20	21	60	1.55	121470	3
FREUROTH	5000	10	11	38	4.84	608160	0
LIARWHD	1000	13	14	27	1.06	2.3011e-16	0
LIARWHD	5000	13	14	23	4.11	6.0958e-16	0
MOREBV	1000	2	3	267	1.68	2.0186e-09	0
MOREBV	5000	1	2	76	3.94	3.0225e-10	0
MSQRTALS	1024	35	36	5920	711.11	1.0125e-09	0
MSQRTALS	529	35	36	5299	198.23	2.6026e-10	0
MSQRTBLS	529	44	45	7421	274.70	8.4196e-10	0
MSQRTBLS	1024	32	33	3930	482.85	1.123e-10	0
NCB20B	1000	27	28	1301	96.04	1676	0
NONDIA	1000	29	30	58	1.95	4.3483e-16	0
NONDIA	5000	40	41	83	9.26	2.2006e-08	0
NONDIA	10000	59	60	124	25.56	7.6111e-13	0
NONDQUAR	1000	91	92	944	6.77	9.5606e-06	0
NONDQUAR	5000	82	83	858	26.19	1.7685e-05	0
NONDQUAR	10000	118	119	1280	78.94	9.0406e-06	0
NONMSQRT	529	489	490	188120	5812.37	61.325	0
PENALTY1	1000	55	56	99	8.23	0.0096862	0
POWELLSG	1000	15	16	75	1.13	1.1167e-06	0
POWELLSG	5000	15	16	75	4.33	5.5837e-06	0
POWELLSG	10000	15	16	77	8.82	1.1167e-05	0
POWER	1000	28	29	641	3.61	5.8399e-09	0
QUARTC	1000	35	36	258	2.95	3.7687e-06	0
QUARTC	5000	42	43	410	16.05	6.9762e-06	0
QUARTC	10000	45	46	511	37.63	8.6633e-06	0
SCHMVETT	1000	3	4	50	1.12	-2994	0
SCHMVETT	5000	3	4	49	5.34	-14994	0
SCHMVETT	10000	3	4	50	10.90	-29994	0
SINQUAD	1000	69	70	195	5.96	6.3238e-05	0
SINQUAD	5000	104	105	248	52.89	0.00011612	0
SINQUAD	10000	129	130	305	141.67	0.00013105	0
SPMSRTLS	1000	17	18	165	3.71	1.8899e-11	0
SPMSRTLS	4999	19	20	312	26.84	4.8603e-11	0
SPMSRTLS	10000	20	21	284	52.80	5.2695e-11	0
SROSENBR	1000	10	11	30	0.81	6.6723e-12	0
SROSENBR	5000	10	11	30	3.13	3.3361e-11	0
SROSENBR	10000	10	11	30	6.28	6.6723e-11	0
TESTQUAD	1000	4	5	26	0.53	2.6707e-12	0

Table 10: Unpreconditioned SBMIN on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	8	9	23	0.63	10.01	0
TOINTGSS	5000	8	9	21	3.21	10.002	0
TOINTGSS	10000	8	9	21	6.41	10.001	0
TQUARTIC	1000	13	14	27	1.09	1.0168e-16	0
TQUARTIC	5000	12	13	24	5.90	7.2373e-08	0
TQUARTIC	10000	12	13	24	16.20	1.793e-08	0
TRIDIA	1000	4	5	95	0.81	8.5487e-14	0
TRIDIA	5000	4	5	95	3.69	8.5488e-14	0
TRIDIA	10000	4	5	95	7.67	8.5491e-14	0
VARDIM	1000	36	37	36	1.89	1.1203e-20	0
VARDIM	5000	45	46	45	7.39	1.1459e-18	0
VAREIGVL	1000	12	13	136	2.09	5.8152e-08	0
VAREIGVL	5000	13	14	115	11.26	7.6187e-08	0
WOODS	1000	16	17	65	1.29	5.0956e-15	0
WOODS	10000	16	17	66	10.73	4.7618e-14	0
FLETCHCR	1000	3528	3529	24147	245.90	5.0581e-14	0
GENROSE	1000	1213	1214	7853	86.90	1	0

Table 11: Unpreconditioned SBMIN on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	43	44	3981	12.73	0	0
CATENARY	501	492	493	120656	367.21	-348400	0
CHANDHEQ	100	13	14	135	5.23	6.9121e-08	0
CHEMRCTA	100	10000	10001	3010000	2126.23	0.33624	8
CHEMRCTB	1000	—	—	—	—	—	6
CLPLATEC	5041	2	3	5634	223.50	-0.0050207	0
CORKSCRW	456	1299	1300	1421814	2312.31	26.484	0
DALLASM	196	278	279	136063	126.36	-48198	0
DISCS	36	345	346	21035	25.58	12	0
DRUGDIS	304	10000	10001	7037995	14102.11	4.3234	1
DTOC5	9999	29	30	100332	6595.15	1.5316	0
EXPFITB	5	55	56	1937	3.26	0.0050193	0
EXPFITC	5	80	81	5005	19.97	0.023303	0
FCCU	19	16	17	102	0.54	11.149	0
FLETCHER	4	27	28	127	0.77	19.525	0
GILBERT	500	27	28	55	1.95	237.37	0
GRIDNETA	3444	28	29	6766	100.43	161.61	0
GRIDNETE	3444	16	17	5038	128.77	144.06	0
HADAMARD	257	10000	10001	2204646	17622.42	1.5345	1
HAGER3	2001	6	7	4969	68.60	0.14096	0
HAGER4	2001	9	10	163878	1219.52	2.7942	0
HS114	10	1844	1845	46508	54.94	-1768.8	0
HS59	2	470	471	1930	11.90	-7.8028	0
HS75	4	1218	1219	18630	33.29	5174.4	3
HVYCRASH	204	10000	10001	6258604	7639.20	-0.065571	1
HYDROELL	1009	137	138	48621	247.64	-3.5855e+06	0
JUNKTURN	5010	69	70	126285	5428.40	9.4126e-06	0
KSIP	20	47	48	3086	31.91	0.57579	0
LINVERSE	1999	13	14	1653	49.45	682	0
LMINSURF	1024	477	478	1625	37.11	9	0
MANNE	300	7	8	424	1.62	-0.97457	0
MEYER3	3	449	450	1324	11.12	87.946	0
MINPERM	51	10	11	54	0.45	0.0384	0
MISTAKE	9	26	27	246	0.83	-1	0
NGONE	50	805	806	43906	147.06	-0.64103	0
NLMSURF	1024	1244	1245	5785	110.13	38.591	0
NYSTROM5	18	17	18	116	0.46	2.5972e-07	0
ODC	10404	19	20	1527	187.16	-0.0040122	0
OET1	3	43	44	1750	11.53	0.53824	0
OPTCTRL3	122	50	51	3387	3.82	2048	0
ORTHREGA	2053	247	248	2740	94.44	5661.4	0
ORTHREGC	5005	54	55	1191	98.34	94.813	0

Table 12: Unpreconditioned SBMIN on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	44	45	224	1.58	15.59	0
ORTHREGF	1205	44	45	493	8.01	16.2	0
PRODPL1	60	63	64	1591	2.13	35.739	0
QR3D	610	306	307	23161	588.59	1.7215e-08	0
QR3DBD	457	182	183	6787	115.71	1.1557e-09	0
READING1	202	351	352	115566	156.40	-0.16049	0
SEMICON1	102	9748	9749	301230	576.08	4.5843e-07	0
SEMICON2	1002	367	368	855515	4703.77	0.00033273	8
SIPOW1	2	49	50	1222	19.00	-1	0
SPANHYD	97	18	19	584	0.88	239.74	0
SSC	10404	1	2	133	34.82	-2.0782	0
SSEBNLN	194	52	53	3277	3.47	1.6171e+07	0
SSNLBEAM	1503	—	—	—	—	—	6
STEENBRE	540	2069	2070	432942	426.81	27459	0
TENBARS1	18	477	478	5724	13.14	2295.4	0
TENBARS2	18	259	260	2496	6.97	2277.9	0
TRAINF	408	34	35	32374	38.42	3.0975	0
TRUSPYR1	11	765	766	3955	20.65	11.228	0
UBH5	1000	—	—	—	—	—	6
WATER	31	34	35	510	1.06	10549	0
ZIGZAG	304	149	150	129299	142.12	33.787	0

Table 13: Unpreconditioned SBMIN on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.27	5.7444	0
ARWHEAD	100	5	6	7	0.22	0	0
ARWHEAD	500	5	6	6	0.45	1.3237e-09	0
BARD	3	7	8	13	0.23	0.0082149	0
BDQRTIC	100	11	12	23	0.44	378.77	0
BDQRTIC	500	11	12	24	0.97	1981	0
BEALE	2	7	8	14	0.22	2.9425e-14	0
BIGGS6	6	56	57	115	1.47	1.2623e-12	0
BOX3	3	7	8	13	0.21	1.9221e-11	0
BRKMCC	2	3	4	5	0.11	0.16904	0
BROWNAL	10	5	6	42	0.17	9.2726e-11	0
BROWNBS	2	34	35	50	0.91	0	0
BROWNDEN	4	11	12	20	0.32	85822	0
BROYDN7D	10	16	17	32	0.47	1.2611	0
BROYDN7D	100	27	28	60	0.90	29.362	0
BROYDN7D	500	78	79	164	4.41	169.58	0
BRYBND	10	11	12	36	0.32	7.2241e-15	0
BRYBND	100	12	13	38	0.53	1.3572e-12	0
BRYBND	500	15	16	43	1.45	1.7435e-13	0
CHNROSNB	10	29	30	58	0.78	4.1665e-22	0
CLIFF	2	27	28	30	0.73	0.19979	0
CRAGGLVY	100	14	15	25	0.51	32.27	0
CRAGGLVY	4	16	17	30	0.45	4.2706e-08	0
CRAGGLVY	500	14	15	25	1.03	167.45	0
CUBE	2	36	37	71	0.94	7.4316e-17	0
DENSCHNA	2	5	6	9	0.17	1.2e-15	0
DENSCHNB	2	3	4	5	0.11	0	0
DENSCHNC	2	9	10	13	0.27	1.8423e-13	0
DENSCHND	3	33	34	63	0.88	8.6576e-09	0
DENSCHNE	3	11	12	16	0.31	2.4642e-12	0
DENSCHNF	2	6	7	12	0.19	6.5139e-22	0
DIXMAANA	15	5	6	9	0.12	1	0
DIXMAANA	90	5	6	14	0.16	1	0
DIXMAANA	300	5	6	14	0.28	1	0
DIXMAANB	15	6	7	11	0.15	1	0
DIXMAANB	90	8	9	18	0.23	1	0
DIXMAANB	300	7	8	13	0.34	1	0
DIXMAANC	15	9	10	15	0.18	1	0
DIXMAANC	90	9	10	16	0.24	1	0
DIXMAANC	300	11	12	20	0.48	1	0
DIXMAAND	15	9	10	16	0.19	1	0
DIXMAAND	90	10	11	21	0.27	1	0

Table 14: SBMIN with band preconditioning on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.46	1	0
DIXMAANE	15	6	7	12	0.14	1	0
DIXMAANE	90	6	7	16	0.19	1	0
DIXMAANE	300	6	7	16	0.31	1	0
DIXMAANF	15	10	11	20	0.20	1	0
DIXMAANF	90	10	11	21	0.25	1	0
DIXMAANF	300	19	20	40	0.74	1	0
DIXMAANG	15	11	12	22	0.20	1	0
DIXMAANG	90	16	17	33	0.39	1	0
DIXMAANG	300	24	25	48	0.91	1	0
DIXMAANH	15	13	14	26	0.24	1	0
DIXMAANH	90	19	20	40	0.47	1	0
DIXMAANH	300	23	24	47	0.86	1	0
DIXMAANI	15	5	6	11	0.12	1	0
DIXMAANI	90	6	7	15	0.19	1	0
DIXMAANI	300	6	7	15	0.31	1	0
DIXMAANJ	15	12	13	24	0.23	1	0
DIXMAANJ	90	20	21	42	0.47	1	0
DIXMAANJ	300	21	22	43	0.83	1	0
DIXMAANK	15	16	17	32	0.29	1	0
DIXMAANK	90	18	19	37	0.44	1	0
DIXMAANK	300	24	25	49	0.91	1	0
DIXMAANL	15	15	16	29	0.28	1	0
DIXMAANL	90	42	43	88	0.92	1	0
DIXMAANL	300	25	26	63	0.95	1	0
DIXON3DQ	10	2	3	4	0.10	0	0
DJTL	2	135	136	185	3.37	-8951.5	0
DQDRTIC	10	2	3	2	0.08	1.6602e-23	0
DQDRTIC	100	2	3	2	0.12	1.6602e-23	0
DQDRTIC	500	2	3	2	0.26	1.6602e-23	0
DQRTIC	100	26	27	47	0.83	4.5801e-07	0
DQRTIC	500	33	34	59	1.74	5.8379e-07	0
EDENSCH	36	12	13	21	0.39	219.28	0
EIGENALS	110	17	18	65	1.10	5.2529e-11	0
EIGENALS	420	34	35	119	14.79	6.3179e-11	0
EIGENBLS	110	226	227	2662	23.60	1.3787e-08	0
EIGENBLS	420	540	541	13166	666.70	2.0025e-07	0
EIGENCLS	462	582	583	6342	550.82	1.3921e-09	0
ENGVAL1	100	7	8	14	0.28	109.09	0
ENGVAL1	2	7	8	12	0.21	0	0
ERRINROS	10	53	54	108	1.36	6.6946	0
ERRINROS	50	74	75	147	2.06	39.904	0

Table 15: SBMIN with band preconditioning on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.34	0.24051	0
EXTROSNB	5	63	64	125	1.65	1.3823e-16	0
FLETCBV2	100	1	2	2	0.09	-0.51401	0
FLETCBV3	100	10000	10001	20356	327.07	-1656.3	1
FLETCHBV	10	320	321	592	8.19	-2.0742e+06	0
FLETCHBV	100	10000	10001	16863	284.61	-1.4795e+11	1
FLETCHCR	10	34	35	68	0.89	4.5207e-21	0
FLETCHCR	100	227	228	453	6.68	1.6906e-13	0
FMINSURF	121	83	84	218	3.25	1	0
FMINSURF	16	17	18	35	0.47	1	0
FREUROTH	100	10	11	17	0.36	11965	0
FREUROTH	2	9	10	14	0.27	48.984	0
FREUROTH	50	10	11	17	0.33	5881	0
FREUROTH	500	10	11	17	0.73	60634	0
GENROSE	10	41	42	80	1.06	1	0
GENROSE	100	120	121	252	3.57	1	0
GENROSE	500	585	586	1178	28.08	1	0
GROWTHLS	3	173	174	315	4.37	1.004	0
GULF	3	35	36	67	1.11	2.9746e-09	0
HAIRY	2	102	103	163	1.65	20	0
HATFLDD	3	19	20	37	0.53	6.6151e-08	0
HATFLDE	3	22	23	43	0.62	5.1204e-07	0
HEART6LS	6	1690	1691	3933	43.23	4.8324e-14	0
HELIX	3	12	13	23	0.34	2.9584e-13	0
HILBERTA	2	2	3	2	0.06	6.656e-31	0
HILBERTB	5	2	3	2	0.06	1.5953e-29	0
HIMMELBB	2	12	13	15	0.33	2.0444e-23	0
HIMMELBF	4	218	219	642	5.75	318.57	0
HIMMELBG	2	8	9	11	0.17	5.1108e-17	0
HIMMELBH	2	1	2	1	0.04	-1	0
HYDC20LS	99	10000	10001	1042471	2544.66	0.067657	1
JENSMP	2	9	10	14	0.26	124.36	0
KOWOSB	4	10	11	20	0.27	0.0003078	0
LIARWHD	100	13	14	37	0.48	9.0888e-21	0
LIARWHD	36	10	11	32	0.33	1.1625e-16	0
LIARWHD	500	15	16	36	0.97	3.7352e-14	0
LOGROS	2	69	70	117	1.78	1.419e-11	0
MANCINO	100	15	16	23	17.65	9.2449e-18	0
MOREBV	10	2	3	4	0.09	6.582e-14	0
MOREBV	100	1	2	2	0.10	7.887e-10	0
MOREBV	500	1	2	2	0.23	5.9316e-12	0
MSQRTALS	100	17	18	244	1.71	6.2267e-10	0

Table 16: SBMIN with band preconditioning on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	35	0.44	6.4235e-12	0
MSQRTALS	49	17	18	101	0.72	5.9493e-11	0
MSQRTBLS	100	22	23	314	2.17	8.4961e-10	0
MSQRTBLS	49	18	19	165	0.84	2.2931e-10	0
MSQRTBLS	9	14	15	41	0.39	3.2336e-11	0
NCB20B	100	23	24	891	5.52	196.68	0
NCB20B	50	26	27	651	1.98	99.504	0
NCB20B	500	24	25	705	29.24	897.52	0
NONDIA	100	19	20	47	0.62	2.898e-15	0
NONDIA	50	19	20	48	0.57	6.6466e-13	0
NONDIA	500	18	19	42	1.09	2.4158e-10	0
NONDQUAR	100	15	16	37	0.53	2.2854e-09	0
NONDQUAR	500	16	17	36	0.92	3.9386e-09	0
NONMSQRT	100	10000	10001	2970701	8591.05	18.072	1
NONMSQRT	49	10000	10001	1300240	1657.87	1.076	1
NONMSQRT	9	114	115	494	3.04	0.75192	0
OSBORNEA	5	37	38	86	1.07	5.4892e-05	0
OSBORNEB	11	19	20	78	0.80	0.040138	0
PALMER1C	8	20	21	174	0.63	0.097605	0
PALMER1D	7	14	15	56	0.44	0.65267	0
PALMER2C	8	19	20	200	0.59	0.014369	0
PALMER3C	8	11	12	78	0.36	0.019539	0
PALMER4C	8	24	25	215	0.73	0.050312	0
PENALTY1	10	40	41	169	1.07	7.1235e-05	0
PENALTY1	100	52	53	662	2.21	0.00090259	0
PENALTY1	50	66	67	539	2.07	0.0004318	0
PENALTY1	500	55	56	588	8.13	0.0047799	0
PENALTY2	10	103	104	382	2.72	0.00029383	0
PENALTY2	100	19	20	87	0.83	97096	0
PENALTY2	50	39	40	188	1.30	4.2961	0
PENALTY3	100	35	36	81	27.83	0.00099996	0
PENALTY3	50	22	23	65	4.40	0.001	0
PFIT1LS	3	433	434	942	10.87	3.5317e-07	0
POWELLSG	100	15	16	30	0.51	2.1902e-07	0
POWELLSG	500	15	16	30	0.85	1.1139e-06	0
POWELLSG	20	15	16	30	0.44	4.0054e-08	0
POWELLSG	4	15	16	30	0.42	4.2527e-09	0
POWER	10	16	17	40	0.48	1.1098e-08	0
POWER	100	22	23	66	0.81	5.0264e-09	0
POWER	50	19	20	54	0.59	2.3411e-08	0
POWER	500	26	27	78	2.81	5.9786e-09	0
QUARTC	100	26	27	47	0.84	4.5801e-07	0

Table 17: SBMIN with band preconditioning on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.62	5.2022e-08	0
QUARTC	500	33	34	59	1.71	5.8379e-07	0
ROSENBR	2	30	31	56	0.79	5.9301e-13	0
S308	2	10	11	16	0.30	0.7732	0
SCHMVETT	10	3	4	6	0.08	-24	0
SCHMVETT	500	3	4	6	0.41	-1494	0
SCHMVETT	3	3	4	6	0.08	-3	0
SCHMVETT	500	3	4	6	0.40	-1494	0
SINQUAD	100	56	57	208	1.98	3.9956e-07	0
SINQUAD	5	11	12	22	0.35	1.1721e-08	0
SINQUAD	50	38	39	142	1.20	1.0969e-07	0
SINQUAD	500	109	110	397	7.69	1.5238e-06	0
SISSER	2	12	13	19	0.34	1.1139e-08	0
SNAIL	2	90	91	161	1.55	6.4135e-17	0
SPMSRTLS	100	14	15	26	0.56	3.2303e-13	0
SPMSRTLS	28	12	13	22	0.38	3.2953e-16	0
SPMSRTLS	499	19	20	36	1.67	8.6834e-12	0
SROSENBR	10	6	7	10	0.20	4.6748e-17	0
SROSENBR	100	6	7	10	0.24	4.6748e-16	0
SROSENBR	50	6	7	10	0.21	2.3374e-16	0
SROSENBR	500	10	11	20	0.63	2.9154e-13	0
TOINTGOR	50	9	10	84	0.33	1373.9	0
TOINTGSS	10	2	3	4	0.06	10	0
TOINTGSS	100	2	3	4	0.10	10	0
TOINTGSS	50	2	3	4	0.08	10	0
TOINTGSS	500	2	3	4	0.26	10	0
TOINTPSP	50	23	24	88	0.74	225.56	0
TOINTQOR	50	6	7	30	0.23	1175.5	0
TQUARTIC	100	12	13	35	0.44	2.7682e-11	0
TQUARTIC	5	1	2	2	0.07	4.4373e-31	0
TQUARTIC	50	10	11	35	0.33	5.2793e-13	0
TQUARTIC	500	15	16	42	0.95	4.787e-15	0
TRIDIA	10	1	2	2	0.07	1.0805e-30	0
TRIDIA	100	2	3	3	0.12	1.352e-32	0
TRIDIA	50	2	3	3	0.11	1.352e-32	0
TRIDIA	500	2	3	3	0.30	1.3482e-32	0
VARDIM	10	14	15	14	0.42	1.595e-26	0
VARDIM	100	25	26	25	0.93	5.171e-26	0
VARDIM	50	22	23	22	0.69	1.2641e-27	0
VARDIM	500	33	34	33	5.46	1.1634e-25	0
VAREIGVL	10	18	19	79	0.50	1.7553e-09	0
VAREIGVL	100	12	13	84	0.55	3.3727e-09	0

Table 18: SBMIN with band preconditioning on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.47	2.9295e-10	0
VAREIGVL	500	12	13	63	1.75	2.0175e-08	0
VIBRBEAM	8	31	32	104	1.06	0.15647	3
WATSON	12	8	9	44	0.33	7.76e-08	0
WATSON	31	10	11	57	0.49	5.0956e-08	0
WOODS	100	15	16	28	0.52	2.0135e-17	0
WOODS	4	15	16	28	0.44	8.0539e-19	0
WOODS	500	16	17	31	0.96	9.8289e-15	0
YFITU	3	94	95	220	2.44	7.0902e-09	0
ZANGWIL2	2	1	2	1	0.05	-18.2	0
PFIT2LS	3	249	250	475	6.40	9.2941e-10	0
PFIT3LS	3	155	156	270	3.94	4.2146e-15	0
PFIT4LS	3	386	387	678	9.63	1.6634e-09	0
EXTROSNB	10	521	522	1221	13.15	3.0361e-09	0
EXTROSNB	50	867	868	1733	23.23	1.0986e-07	0
EXTROSNB	100	930	931	1859	26.67	8.9546e-08	0

Table 19: SBMIN with band preconditioning on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.79	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.14	1.11e-12	0
BDQRTIC	1000	11	12	24	1.74	3983.8	0
BROYDN7D	1000	120	121	246	10.54	345.54	0
BRYBND	1000	16	17	46	2.69	1.8775e-12	0
BRYBND	5000	31	32	89	22.91	1.538e-12	0
CRAGGLVY	1000	14	15	25	1.69	336.42	0
CRAGGLVY	5000	14	15	26	7.62	1688.2	0
DIXMAANA	1500	5	6	15	0.97	1	0
DIXMAANA	3000	5	6	15	1.90	1	0
DIXMAANB	1500	7	8	14	1.14	1	0
DIXMAANB	3000	7	8	14	2.20	1	0
DIXMAANC	1500	17	18	28	2.13	1	0
DIXMAANC	3000	14	15	27	3.73	1	0
DIXMAAND	1500	9	10	21	1.38	1	0
DIXMAAND	3000	11	12	24	2.97	1	0
DIXMAANE	1500	6	7	17	1.09	1	0
DIXMAANE	3000	6	7	17	2.09	1	0
DIXMAANF	1500	25	26	49	3.00	1	0
DIXMAANF	3000	26	27	50	5.62	1	0
DIXMAANG	1500	21	22	42	2.65	1	0
DIXMAANG	3000	50	51	102	9.67	1	0
DIXMAANH	1500	38	39	79	4.38	1	0
DIXMAANH	3000	39	40	77	8.56	1	0
DIXMAANI	1500	7	8	23	1.20	1	0
DIXMAANI	3000	7	8	29	2.48	1	0
DIXMAANJ	1500	34	35	78	3.78	1	0
DIXMAANJ	3000	40	41	101	8.46	1	0
DIXMAANK	1500	35	36	83	3.87	1	0
DIXMAANK	3000	32	33	69	6.67	1	0
DIXMAANL	1500	43	44	110	4.59	1	0
DIXMAANL	3000	47	48	116	9.89	1	0
DQDRTIC	1000	2	3	2	0.42	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.84	1.6602e-23	0
DQRTIC	1000	35	36	62	2.74	3.6952e-06	0
DQRTIC	5000	42	43	73	13.07	7.0042e-06	0
EDENSCH	2000	12	13	21	2.55	12003	0
EIGENALS	930	53	54	211	98.60	9.5824e-11	0
EIGENBLS	930	602	603	17836	3147.96	1.3558e-06	0
ENGVAL1	1000	7	8	14	1.18	1108.2	0
ENGVAL1	5000	7	8	14	5.06	5548.7	0
FLETCBV2	1000	0	1	0	0.59	-0.50134	0

Table 20: SBMIN with band preconditioning on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1162.62	-1.8877e+06	1
FMINSURF	1024	315	316	751	110.10	1	0
FMINSURF	5625	166	167	661	1298.41	1	0
FREUROTH	1000	10	11	17	1.48	121470	0
FREUROTH	5000	10	11	17	6.49	608160	0
LIARWHD	1000	14	15	35	1.75	2.0274e-20	0
LIARWHD	5000	13	14	28	7.09	6.0958e-16	0
MOREBV	1000	1	2	2	0.67	7.3289e-13	0
MOREBV	5000	1	2	2	3.13	5.8478e-15	0
MSQRTALS	1024	44	45	6027	789.47	2.6448e-09	0
MSQRTALS	529	43	44	5746	238.30	7.9315e-08	0
MSQRTBLS	529	44	45	4710	200.34	4.939e-08	0
MSQRTBLS	1024	31	32	3356	458.07	1.3483e-08	0
NCB20B	1000	22	23	590	50.89	1676	0
NONDIA	1000	29	30	76	2.82	6.991e-16	0
NONDIA	5000	43	44	112	15.97	7.0899e-17	0
NONDIA	10000	60	61	155	41.87	7.1463e-13	0
NONDQUAR	1000	17	18	36	1.76	1.3932e-09	0
NONDQUAR	5000	18	19	37	7.29	1.0076e-09	0
NONDQUAR	10000	19	20	38	14.83	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	63	64	495	24.36	0.0096862	0
POWELLSG	1000	15	16	30	1.53	2.2324e-06	0
POWELLSG	5000	15	16	32	6.14	5.2976e-06	0
POWELLSG	10000	15	16	32	12.13	1.0595e-05	0
POWER	1000	27	28	80	8.21	1.8888e-08	0
QUARTC	1000	35	36	62	3.09	3.6952e-06	0
QUARTC	5000	42	43	73	14.31	7.0042e-06	0
QUARTC	10000	45	46	78	29.94	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.99	-2994	0
SCHMVETT	5000	3	4	6	4.61	-14994	0
SCHMVETT	10000	3	4	6	9.07	-29994	0
SINQUAD	1000	131	132	472	16.65	9.0365e-07	0
SINQUAD	5000	245	246	831	197.50	1.2196e-06	0
SINQUAD	10000	315	316	1022	516.86	2.0292e-06	0
SPMSRTLS	1000	21	22	43	3.46	4.3567e-16	0
SPMSRTLS	4999	21	22	43	16.11	1.862e-15	0
SPMSRTLS	10000	24	25	50	36.25	8.9106e-14	0
SROSENBR	1000	10	11	20	1.21	5.8309e-13	0
SROSENBR	5000	10	11	20	5.03	2.9154e-12	0
SROSENBR	10000	10	11	20	9.96	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.85	7.6524e-11	0

Table 21: SBMIN with band preconditioning on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.70	10	0
TOINTGSS	5000	2	3	4	3.21	10	0
TOINTGSS	10000	2	3	4	6.30	10	0
TQUARTIC	1000	12	13	36	1.59	2.9487e-11	0
TQUARTIC	5000	20	21	51	11.37	1.1107e-10	0
TQUARTIC	10000	18	19	44	25.45	3.5718e-15	0
TRIDIA	1000	2	3	3	0.77	1.3827e-32	0
TRIDIA	5000	2	3	3	3.37	4.1976e-33	0
TRIDIA	10000	2	3	3	6.59	5.3451e-33	0
VARDIM	1000	36	37	36	19.71	1.1203e-20	0
VARDIM	5000	45	46	45	549.51	1.1459e-18	0
VAREIGVL	1000	12	13	70	4.98	5.6139e-08	0
VAREIGVL	5000	13	14	59	84.88	7.7013e-08	0
WOODS	1000	16	17	31	1.70	1.9658e-14	0
WOODS	10000	16	17	31	14.32	1.9658e-13	0
FLETCHCR	1000	2137	2138	4273	145.93	2.816e-12	0
GENROSE	1000	1094	1095	2252	76.76	1	0

Table 22: SBMIN with band preconditioning on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	101	102	5478	30.23	0	0
CATENARY	501	834	835	14723	91.92	-348400	0
CHANDHEQ	100	13	14	62	6.98	6.7959e-08	0
CHEMRCTA	100	50	51	733	2.28	2.3822e-16	0
CHEMRCTB	1000	119	120	419	17.83	4.3604e-10	0
CLPLATEC	5041	3	4	3935	199.75	-0.0050207	0
CORKSCRW	456	129	130	76738	223.44	26.484	0
DALLASM	196	82	83	15783	24.42	-48198	0
DISCS	36	1482	1483	74816	133.93	12	0
DRUGDIS	304	210	211	3596	21.49	4.2447	0
DTOC5	9999	25	26	91	46.90	1.5316	0
EXPFITB	5	62	63	902	3.32	0.0050193	0
EXPFITC	5	84	85	1696	15.16	0.023303	0
FCCU	19	16	17	57	0.58	11.149	0
FLETCHER	4	31	32	64	0.87	19.525	0
GILBERT	500	29	30	71	3.82	237.37	0
GRIDNETA	3444	35	36	3753	88.97	161.61	0
GRIDNETE	3444	27	28	2939	105.34	144.06	0
HADAMARD	257	521	522	28260	371.52	1	0
HAGER3	2001	12	13	32	4.27	0.14096	0
HAGER4	2001	11	12	2294	45.83	2.7942	0
HS114	10	797	798	4853	22.04	-1768.8	0
HS59	2	387	388	813	10.04	-7.8028	0
HS75	4	143	144	575	3.89	5174.4	0
HVYCRASH	204	248	249	767	10.15	-0.2185	0
HYDROELL	1009	143	144	22557	263.42	-3.5855e+06	0
JUNKTURN	5010	72	73	1048	88.07	9.3904e-06	0
KSIP	20	69	70	3794	68.44	0.57579	0
LINVERSE	1999	31	32	2052	88.24	681	0
LMINSURF	1024	269	270	786	29.39	9	0
MANNE	300	6	7	75	1.07	-0.97457	0
MEYER3	3	467	468	1263	12.41	87.946	0
MINPERM	51	18	19	141	0.80	0.0384	0
MISTAKE	9	32	33	215	1.00	-1	0
NGONE	50	1134	1135	31185	176.71	-0.64103	0
NLMSURF	1024	842	843	2485	92.07	38.591	0
NYSTROM5	18	32	33	391	1.03	2.3872e-05	0
ODC	10404	19	20	916	144.08	-0.0040122	0
OET1	3	38	39	974	13.69	0.53824	0
OPTCTRL3	122	61	62	249	2.50	2048	0
ORTHREGA	2053	205	206	1067	72.25	5661.4	0
ORTHREGC	5005	55	56	415	64.90	94.813	0

Table 23: SBMIN with band preconditioning on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	652	653	3135	24.35	15.59	0
ORTHREGF	1205	219	220	501	28.14	27.809	0
PRODPL1	60	53	54	1060	2.03	35.739	0
QR3D	610	245	246	24421	701.93	3.245e-09	0
QR3DBD	457	243	244	3054	97.89	3.5672e-10	0
READING1	202	758	759	16667	59.29	-0.16049	0
SEMICON1	102	779	780	1461	34.68	2.5856e-14	0
SEMICON2	1002	134	135	261	31.52	1.6734e-06	0
SIPOW1	2	40	41	1239	32.55	-1	0
SPANHYD	97	27	28	531	1.39	239.74	0
SSC	10404	1	2	93	28.56	-2.0782	0
SSEBNLN	194	63	64	1409	4.00	1.6171e+07	0
SSNLBEAM	1503	114	115	4117	76.60	340.03	0
STEENBRE	540	3096	3097	47768	172.64	27459	0
TENBARS1	18	525	526	6207	16.04	2295.4	0
TENBARS2	18	326	327	2647	9.48	2277.9	0
TRAINF	408	43	44	1275	6.01	3.0975	0
TRUSPYR1	11	856	857	3862	23.27	11.229	0
UBH5	1010	87	88	22504	140.05	1.1163	0
WATER	31	40	41	373	1.34	10549	0
ZIGZAG	304	89	90	17835	45.32	33.787	0

Table 24: SBMIN with band preconditioning on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	14	0.27	5.7444	0
ARWHEAD	100	5	6	7	0.24	0	0
ARWHEAD	500	5	6	6	0.67	1.3224e-09	0
BARD	3	10	11	19	0.30	0.0082149	0
BDQRTIC	100	11	12	20	0.53	378.77	0
BDQRTIC	500	11	12	20	2.62	1981	0
BEALE	2	7	8	14	0.22	2.9425e-14	0
BIGGS6	6	59	60	127	1.61	2.5372e-11	0
BOX3	3	7	8	14	0.23	6.075e-12	0
BRKMCC	2	3	4	5	0.11	0.16904	0
BROWNAL	10	4	5	7	0.15	1.1263e-10	0
BROWNBS	2	39	40	62	1.06	1.9722e-31	0
BROWNDEN	4	11	12	20	0.33	85822	0
BROYDN7D	10	18	19	36	0.52	1.2611	0
BROYDN7D	100	26	27	52	0.99	30.022	0
BROYDN7D	500	32	33	63	2.64	150.87	0
BRYBND	10	12	13	23	0.37	1.9159e-16	0
BRYBND	100	13	14	25	0.64	9.7214e-15	0
BRYBND	500	10	11	22	1.43	2.4154e-19	0
CHNROSNB	10	29	30	58	0.79	4.1665e-22	0
CLIFF	2	27	28	30	0.76	0.19979	0
CRAGGLVY	100	14	15	25	0.56	32.27	0
CRAGGLVY	4	16	17	30	0.45	4.2706e-08	0
CRAGGLVY	500	14	15	25	1.13	167.45	0
CUBE	2	48	49	93	1.26	1.8398e-14	0
DENSCHNA	2	5	6	9	0.17	1.2e-15	0
DENSCHNB	2	3	4	5	0.11	0	0
DENSCHNC	2	9	10	13	0.27	1.8423e-13	0
DENSCHND	3	41	42	77	1.15	8.7087e-09	0
DENSCHNE	3	10	11	15	0.29	1.9841e-12	0
DENSCHNF	2	6	7	12	0.20	6.5139e-22	0
DIXMAANA	15	5	6	8	0.12	1	0
DIXMAANA	90	4	5	8	0.14	1	0
DIXMAANA	300	4	5	8	0.24	1	0
DIXMAANB	15	6	7	11	0.15	1	0
DIXMAANB	90	6	7	11	0.20	1	0
DIXMAANB	300	6	7	12	0.36	1	0
DIXMAANC	15	7	8	13	0.16	1	0
DIXMAANC	90	8	9	16	0.24	1	0
DIXMAANC	300	9	10	16	0.50	1	0
DIXMAAND	15	9	10	17	0.19	1	0
DIXMAAND	90	14	15	25	0.38	1	0

Table 25: SBMIN with full factorization preconditioning on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	12	13	22	0.61	1	0
DIXMAANE	15	5	6	10	0.13	1	0
DIXMAANE	90	5	6	10	0.16	1	0
DIXMAANE	300	6	7	12	0.30	1	0
DIXMAANF	15	10	11	18	0.22	1	0
DIXMAANF	90	11	12	21	0.32	1	0
DIXMAANF	300	20	21	39	0.90	1	0
DIXMAANG	15	13	14	26	0.27	1	0
DIXMAANG	90	13	14	26	0.37	1	0
DIXMAANG	300	29	30	58	1.25	1	0
DIXMAANH	15	11	12	21	0.23	1	0
DIXMAANH	90	16	17	32	0.43	1	0
DIXMAANH	300	25	26	50	1.11	1	0
DIXMAANI	15	5	6	10	0.12	1	0
DIXMAANI	90	5	6	10	0.16	1	0
DIXMAANI	300	5	6	10	0.28	1	0
DIXMAANJ	15	15	16	31	0.29	1	0
DIXMAANJ	90	18	19	36	0.48	1	0
DIXMAANJ	300	34	35	67	1.42	1	0
DIXMAANK	15	12	13	23	0.24	1	0
DIXMAANK	90	17	18	35	0.47	1	0
DIXMAANK	300	41	42	81	1.67	1	0
DIXMAANL	15	15	16	28	0.29	1	0
DIXMAANL	90	33	34	70	0.81	1	0
DIXMAANL	300	47	48	101	1.93	1	0
DIXON3DQ	10	2	3	4	0.09	2.4652e-32	0
DJTL	2	135	136	187	3.48	-8951.5	0
DQDRTIC	10	2	3	2	0.09	1.6602e-23	0
DQDRTIC	100	2	3	2	0.12	1.6602e-23	0
DQDRTIC	500	2	3	2	0.27	1.6602e-23	0
DQRTIC	100	26	27	47	0.86	4.5801e-07	0
DQRTIC	500	33	34	59	1.80	5.8379e-07	0
EDENSCH	36	14	15	23	0.45	219.28	0
EIGENALS	110	18	19	36	1.13	1.7388e-16	0
EIGENALS	420	33	34	62	14.11	1.0884e-12	0
EIGENBLS	110	147	148	343	33.54	2.9672e-13	0
EIGENBLS	420	558	559	1278	4635.83	2.4106e-11	0
EIGENCLS	462	683	684	1522	7470.54	2.7876e-14	0
ENGVAL1	100	7	8	14	0.30	109.09	0
ENGVAL1	2	7	8	12	0.22	0	0
ERRINROS	10	49	50	95	1.35	6.6946	0
ERRINROS	50	65	66	127	1.95	39.904	0

Table 26: SBMIN with full factorization preconditioning on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.38	0.24051	0
EXTROSNB	5	63	64	125	1.66	1.3823e-16	0
FLETCBV2	100	1	2	2	0.10	-0.51401	0
FLETCBV3	100	10000	10001	18745	348.51	-2518.1	1
FLETCHBV	10	380	381	609	10.10	-2.1804e+06	0
FLETCHBV	100	10000	10001	15308	300.43	-1.5784e+11	1
FLETCHCR	10	34	35	68	0.91	4.5207e-21	0
FLETCHCR	100	226	227	452	7.19	8.117e-16	0
FMINSURF	121	22	23	44	2.69	1	0
FMINSURF	16	13	14	24	0.40	1	0
FREUROTH	100	11	12	19	0.42	11965	0
FREUROTH	2	9	10	14	0.28	48.984	0
FREUROTH	50	11	12	19	0.36	5881	0
FREUROTH	500	11	12	19	0.84	60634	0
GENROSE	10	39	40	77	1.04	1	0
GENROSE	100	120	121	241	3.88	1	0
GENROSE	500	538	539	1078	28.91	1	0
GROWTHLS	3	162	163	297	4.21	1.004	0
GULF	3	46	47	93	1.50	6.1977e-12	0
HAIRY	2	87	88	145	1.46	20	0
HATFLDD	3	10	11	20	0.31	6.6151e-08	0
HATFLDE	3	11	12	22	0.34	5.1204e-07	0
HEART6LS	6	6524	6525	12547	172.32	1.0421e-12	0
HELIX	3	11	12	22	0.32	4.6363e-18	0
HILBERTA	2	2	3	2	0.06	6.656e-31	0
HILBERTB	5	2	3	2	0.07	1.5953e-29	0
HIMMELBB	2	23	24	30	0.64	1.272e-14	0
HIMMELBF	4	283	284	653	7.59	318.57	0
HIMMELBG	2	8	9	11	0.17	5.1108e-17	0
HIMMELBH	2	1	2	1	0.04	-1	0
HYDC20LS	99	10000	10001	105398	711.86	2.2388	1
JENSMP	2	9	10	14	0.28	124.36	0
KOWOSB	4	12	13	25	0.34	0.0003078	0
LIARWHD	100	10	11	19	0.40	1.2325e-15	0
LIARWHD	36	10	11	18	0.34	4.3062e-17	0
LIARWHD	500	14	15	21	1.16	2.4691e-12	0
LOGROS	2	69	70	117	1.76	1.419e-11	0
MANCINO	100	12	13	19	28.87	4.5339e-21	0
MOREBV	10	2	3	4	0.09	6.582e-14	0
MOREBV	100	1	2	2	0.10	7.887e-10	0
MOREBV	500	1	2	2	0.25	5.9316e-12	0
MSQRTALS	100	39	40	75	6.38	1.1027e-10	0

Table 27: SBMIN with full factorization preconditioning on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	35	0.45	6.4235e-12	0
MSQRTALS	49	19	20	34	0.96	8.1558e-11	0
MSQRTBLS	100	51	52	101	8.44	7.2452e-13	0
MSQRTBLS	49	23	24	45	1.14	3.9226e-11	0
MSQRTBLS	9	12	13	23	0.35	1.1251e-12	0
NCB20B	100	43	44	138	4.88	196.68	0
NCB20B	50	18	19	107	1.10	99.504	0
NCB20B	500	51	52	109	30.28	897.52	0
NONDIA	100	15	16	22	0.55	2.3207e-11	0
NONDIA	50	12	13	18	0.40	3.8512e-16	0
NONDIA	500	22	23	34	1.83	9.8906e-21	0
NONDQUAR	100	15	16	27	0.59	2.3999e-09	0
NONDQUAR	500	16	17	27	2.13	2.2043e-09	0
NONMSQRT	100	—	—	—	—	—	6
NONMSQRT	49	1578	1579	207164	270.35	1.076	0
NONMSQRT	9	329	330	2922	9.41	0.75194	0
OSBORNEA	5	31	32	55	0.99	5.4649e-05	0
OSBORNEB	11	20	21	38	0.81	0.040138	0
PALMER1C	8	10	11	17	0.33	0.097605	0
PALMER1D	7	8	9	15	0.27	0.65267	0
PALMER2C	8	7	8	13	0.23	0.014369	0
PALMER3C	8	7	8	13	0.24	0.019538	0
PALMER4C	8	7	8	13	0.23	0.050311	0
PENALTY1	10	39	40	66	1.05	7.1118e-05	0
PENALTY1	100	47	48	72	4.29	0.00090256	0
PENALTY1	50	49	50	79	1.94	0.00043179	0
PENALTY1	500	54	55	79	292.02	0.0047796	0
PENALTY2	10	65	66	129	1.71	0.0002941	0
PENALTY2	100	19	20	38	2.01	97096	0
PENALTY2	50	34	35	64	1.46	4.2961	0
PENALTY3	100	36	37	114	46.86	0.00099997	0
PENALTY3	50	23	24	93	6.40	0.001	0
PFIT1LS	3	302	303	525	7.79	8.8829e-07	0
POWELLSG	100	15	16	30	0.53	1.0595e-07	0
POWELLSG	500	15	16	30	0.91	5.2976e-07	0
POWELLSG	20	15	16	30	0.47	2.119e-08	0
POWELLSG	4	15	16	30	0.44	4.2381e-09	0
POWER	10	16	17	31	0.48	1.8532e-08	0
POWER	100	22	23	44	2.20	8.1386e-09	0
POWER	50	20	21	40	0.83	1.3296e-08	0
POWER	500	26	27	52	161.43	7.6219e-09	0
QUARTC	100	26	27	47	0.86	4.5801e-07	0

Table 28: SBMIN with full factorization preconditioning on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.61	5.2022e-08	0
QUARTC	500	33	34	59	1.80	5.8379e-07	0
ROSENBR	2	30	31	58	0.79	5.8845e-13	0
S308	2	10	11	16	0.29	0.7732	0
SCHMVETT	10	3	4	6	0.09	-24	0
SCHMVETT	500	3	4	6	0.44	-1494	0
SCHMVETT	3	3	4	6	0.09	-3	0
SCHMVETT	500	3	4	6	0.44	-1494	0
SINQUAD	100	11	12	22	0.49	1.1721e-08	0
SINQUAD	5	11	12	22	0.35	1.1721e-08	0
SINQUAD	50	11	12	22	0.40	1.1721e-08	0
SINQUAD	500	11	12	22	1.77	1.1721e-08	0
SISSER	2	12	13	19	0.34	1.1139e-08	0
SNAIL	2	90	91	170	1.52	1.4728e-11	0
SPMSRTLS	100	16	17	30	0.65	3.2762e-11	0
SPMSRTLS	28	12	13	22	0.38	7.9625e-16	0
SPMSRTLS	499	20	21	39	1.96	6.0254e-14	0
SROSENBR	10	6	7	10	0.21	4.6748e-17	0
SROSENBR	100	6	7	10	0.25	4.6748e-16	0
SROSENBR	50	6	7	10	0.22	2.3374e-16	0
SROSENBR	500	10	11	20	0.65	2.9154e-13	0
TOINTGOR	50	8	9	15	0.29	1373.9	0
TOINTGSS	10	2	3	4	0.07	10	0
TOINTGSS	100	2	3	4	0.10	10	0
TOINTGSS	50	2	3	4	0.08	10	0
TOINTGSS	500	2	3	4	0.27	10	0
TOINTPSP	50	25	26	39	0.80	225.56	0
TOINTQOR	50	4	5	8	0.17	1175.5	0
TQUARTIC	100	1	2	2	0.09	3.2698e-28	0
TQUARTIC	5	1	2	2	0.07	6.4095e-31	0
TQUARTIC	50	1	2	2	0.08	2.5638e-30	0
TQUARTIC	500	1	2	2	0.28	1.5772e-27	0
TRIDIA	10	1	2	2	0.07	1.4421e-30	0
TRIDIA	100	2	3	3	0.13	4.1648e-32	0
TRIDIA	50	2	3	3	0.11	4.1648e-32	0
TRIDIA	500	2	3	3	0.31	4.0445e-33	0
VARDIM	10	14	15	14	0.43	1.595e-26	0
VARDIM	100	25	26	25	3.03	5.171e-26	0
VARDIM	50	22	23	22	0.99	1.2641e-27	0
VARDIM	500	33	34	33	300.73	1.1634e-25	0
VAREIGVL	10	34	35	71	0.92	3.104e-11	0
VAREIGVL	100	12	13	24	1.29	3.0802e-09	0

Table 29: SBMIN with full factorization preconditioning on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	26	0.60	1.227e-10	0
VAREIGVL	500	12	13	23	79.15	1.8652e-08	0
VIBRBEAM	8	70	71	127	2.30	0.15645	0
WATSON	12	26	27	55	0.95	2.2756e-09	0
WATSON	31	11	12	24	0.75	1.538e-09	0
WOODS	100	15	16	28	0.55	2.0135e-17	0
WOODS	4	15	16	28	0.45	8.0539e-19	0
WOODS	500	16	17	31	1.02	9.8289e-15	0
YFITU	3	58	59	113	1.53	6.6697e-13	0
ZANGWIL2	2	1	2	1	0.04	-18.2	0
PFIT2LS	3	251	252	433	7.30	2.4974e-08	0
PFIT3LS	3	164	165	287	4.76	7.0125e-12	0
PFIT4LS	3	367	368	581	9.76	5.0063e-09	0
EXTROSNB	10	492	493	983	12.66	6.3572e-13	0
EXTROSNB	50	867	868	1733	23.72	1.0986e-07	0
EXTROSNB	100	930	931	1859	27.17	8.9546e-08	0

Table 30: SBMIN with full factorization preconditioning on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	1.67	1.6903e-10	0
ARWHEAD	5000	5	6	6	27.00	1.11e-12	0
BDQRTIC	1000	11	12	20	8.41	3983.8	0
BROYDN7D	1000	39	40	81	5.46	298.15	0
BRYBND	1000	11	12	23	2.80	4.18e-10	0
BRYBND	5000	12	13	23	14.53	8.532e-15	0
CRAGGLVY	1000	14	15	25	1.90	336.42	0
CRAGGLVY	5000	14	15	26	8.84	1688.2	0
DIXMAANA	1500	4	5	8	0.86	1	0
DIXMAANA	3000	4	5	8	1.65	1	0
DIXMAANB	1500	6	7	12	1.30	1	0
DIXMAANB	3000	6	7	12	2.49	1	0
DIXMAANC	1500	9	10	17	1.90	1	0
DIXMAANC	3000	9	10	17	3.74	1	0
DIXMAAND	1500	13	14	26	2.15	1	0
DIXMAAND	3000	15	16	28	4.91	1	0
DIXMAANE	1500	6	7	12	1.06	1	0
DIXMAANE	3000	6	7	12	2.00	1	0
DIXMAANF	1500	24	25	51	3.52	1	0
DIXMAANF	3000	25	26	50	7.34	1	0
DIXMAANG	1500	32	33	64	4.48	1	0
DIXMAANG	3000	27	28	53	7.92	1	0
DIXMAANH	1500	29	30	60	4.24	1	0
DIXMAANH	3000	46	47	93	12.65	1	0
DIXMAANI	1500	5	6	10	0.98	1	0
DIXMAANI	3000	6	7	12	2.05	1	0
DIXMAANJ	1500	38	39	76	5.52	1	0
DIXMAANJ	3000	49	50	101	13.03	1	0
DIXMAANK	1500	50	51	104	7.01	1	0
DIXMAANK	3000	28	29	61	8.26	1	0
DIXMAANL	1500	36	37	78	5.28	1	0
DIXMAANL	3000	87	88	178	22.79	1	0
DQDRTIC	1000	2	3	2	0.43	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.91	1.6602e-23	0
DQRTIC	1000	35	36	62	2.84	3.6952e-06	0
DQRTIC	5000	42	43	73	13.61	7.0042e-06	0
EDENSCH	2000	14	15	22	3.22	12003	0
EIGENALS	930	41	42	75	76.67	4.8016e-12	0
EIGENBLS	930	—	—	—	—	—	6
ENGVAL1	1000	7	8	14	1.01	1108.2	0
ENGVAL1	5000	7	8	14	4.45	5548.7	0
FLETCBV2	1000	0	1	0	0.34	-0.50134	0

Table 31: SBMIN with full factorization preconditioning on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1251.30	-1.8877e+06	1
FMINSURF	1024	26	27	52	1428.00	1	0
FMINSURF	5625	1	2	1	33.47	28.594	5
FREUROTH	1000	11	12	19	1.42	121470	0
FREUROTH	5000	11	12	19	6.19	608160	0
LIARWHD	1000	13	14	20	2.32	2.9481e-18	0
LIARWHD	5000	13	14	18	29.75	6.0958e-16	0
MOREBV	1000	1	2	2	0.44	7.3289e-13	0
MOREBV	5000	1	2	2	1.99	5.8271e-15	0
MSQRTALS	1024	—	—	—	—	—	6
MSQRTALS	529	131	132	267	2273.92	6.3491e-12	0
MSQRTBLS	529	120	121	245	2072.98	2.5608e-12	0
MSQRTBLS	1024	—	—	—	—	—	6
NCB20B	1000	24	25	76	29.66	1676	0
NONDIA	1000	27	28	43	4.61	5.542e-17	0
NONDIA	5000	41	42	63	102.01	2.3392e-15	0
NONDIA	10000	54	55	83	488.45	3.7931e-11	0
NONDQUAR	1000	17	18	29	6.50	9.7143e-10	0
NONDQUAR	5000	18	19	29	136.52	1.0132e-09	0
NONDQUAR	10000	19	20	30	607.01	3.8883e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	50	51	68	2147.32	0.0096868	0
POWELLSG	1000	15	16	30	1.40	1.0595e-06	0
POWELLSG	5000	15	16	30	5.66	5.2976e-06	0
POWELLSG	10000	15	16	30	11.34	1.0595e-05	0
POWER	1000	28	29	56	1433.48	4.7488e-09	0
QUARTC	1000	35	36	62	2.91	3.6952e-06	0
QUARTC	5000	42	43	73	13.90	7.0042e-06	0
QUARTC	10000	45	46	78	28.76	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.82	-2994	0
SCHMVETT	5000	3	4	6	3.85	-14994	0
SCHMVETT	10000	3	4	6	7.70	-29994	0
SINQUAD	1000	11	12	22	5.08	1.1721e-08	0
SINQUAD	5000	13	14	26	113.28	3.5185e-10	0
SINQUAD	10000	19	20	36	667.95	1.4179e-10	0
SPMSRTLS	1000	19	20	38	3.49	1.2065e-11	0
SPMSRTLS	4999	23	24	47	19.31	1.102e-14	0
SPMSRTLS	10000	21	22	48	37.68	6.4753e-14	0
SROSENBR	1000	10	11	20	0.99	5.8309e-13	0
SROSENBR	5000	10	11	20	4.10	2.9154e-12	0
SROSENBR	10000	10	11	20	8.17	5.8309e-12	0
TESTQUAD	1000	2	3	3	0.46	2.3752e-30	0

Table 32: SBMIN with full factorization preconditioning on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.49	10	0
TOINTGSS	5000	2	3	4	2.21	10	0
TOINTGSS	10000	2	3	4	4.37	10	0
TQUARTIC	1000	1	2	2	0.56	1.7736e-27	0
TQUARTIC	5000	1	2	2	6.09	1.9964e-26	0
TQUARTIC	10000	1	2	2	27.82	1.6149e-25	0
TRIDIA	1000	2	3	3	0.54	1.1556e-33	0
TRIDIA	5000	2	3	3	2.35	4.1889e-33	0
TRIDIA	10000	2	3	3	4.64	1.5407e-32	0
VARDIM	1000	36	37	36	2571.18	1.1203e-20	0
VARDIM	5000	1	2	1	123.23	4.8283e+27	5
VAREIGVL	1000	12	13	24	606.10	5.6909e-08	0
VAREIGVL	5000	1	2	1	38.27	236900	5
WOODS	1000	16	17	31	1.57	1.9658e-14	0
WOODS	10000	16	17	31	13.65	1.9658e-13	0
FLETCHCR	1000	2127	2128	4254	177.32	3.6087e-16	0
GENROSE	1000	1115	1116	2230	92.36	1	0

Table 33: SBMIN with full factorization preconditioning on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	157	158	2674	30.99	0	0
CATENARY	501	520	521	14011	80.71	-348400	0
CHANDHEQ	100	13	14	26	34.93	1.5459e-08	0
CHEMRCTA	100	10000	10001	21185	359.46	0.0066291	8
CHEMRCTB	1000	314	315	637	48.03	2.6101e-20	0
CLPLATEC	5041	1	2	2	2.57	-0.0050207	0
CORKSCRW	456	77	78	3734	20.96	26.484	0
DALLASM	196	42	43	85	2.27	-48198	0
DISCS	36	245	246	866	9.93	20.414	0
DRUGDIS	304	331	332	12152	60.71	0	0
DTOC5	9999	21	22	42	46.51	1.5316	0
EXPFITB	5	29	30	80	1.48	0.0050194	0
EXPFITC	5	43	44	222	6.74	0.023302	0
FCCU	19	10	11	20	0.40	11.149	0
FLETCHER	4	29	30	57	0.86	19.525	0
GILBERT	500	27	28	38	155.43	237.37	0
GRIDNETA	3444	18	19	43	10.43	161.61	0
GRIDNETE	3444	11	12	22	15.47	144.06	0
HADAMARD	257	496	497	3313	663.36	1.1246	0
HAGER3	2001	4	5	8	3.50	0.14096	0
HAGER4	2001	8	9	1014	24.05	2.7942	0
HS114	10	866	867	3392	22.68	-1768.8	0
HS59	2	421	422	726	10.49	-7.8028	0
HS75	4	98	99	234	2.72	5174.4	0
HVYCRASH	204	715	716	2821	34.70	-0.2185	0
HYDROELL	1009	140	141	6996	83.34	-3.5855e+06	0
JUNKTURN	5010	220	221	13923	996.76	1.0099e-05	0
KSIP	20	28	29	247	30.84	0.57579	0
LINVERSE	1999	131	132	1506	87.26	681	0
LMINSURF	1024	21	22	42	4.76	9	0
MANNE	300	8	9	128	1.50	-0.97457	0
MEYER3	3	425	426	1041	10.95	87.946	0
MINPERM	51	29	30	71	1.24	0.0384	0
MISTAKE	9	33	34	82	0.98	-1	0
NGONE	50	84	85	789	10.95	-0.60912	0
NLMSURF	1024	19	20	38	4.37	38.591	0
NYSTROM5	18	46	47	97	1.30	6.9109e-11	0
ODC	10404	19	20	38	55.70	-0.0040122	0
OET1	3	28	29	322	10.52	0.53824	0
OPTCTRL3	122	46	47	91	2.06	2048	0
ORTHREGA	2053	116	117	294	87.66	5661.4	0
ORTHREGC	5005	64	65	445	227.80	94.813	0

Table 34: SBMIN with full factorization preconditioning on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	92	93	170	3.64	15.59	0
ORTHREGF	1205	45	46	98	13.15	16.201	0
PRODPL1	60	76	77	717	2.66	35.739	0
QR3D	610	—	—	—	—	—	6
QR3DBD	457	128	129	254	497.24	1.351e-12	0
READING1	202	1567	1568	21325	99.75	-0.16049	0
SEMICON1	102	609	610	1171	27.47	9.9727e-16	0
SEMICON2	1002	134	135	261	34.29	1.6734e-06	0
SIPOW1	2	28	29	375	28.06	-1	0
SPANHYD	97	42	43	667	2.07	239.74	0
SSC	10404	1	2	2	7.36	-2.0782	0
SSEBNLN	194	65	66	1304	4.03	1.6171e+07	0
SSNLBEAM	1503	162	163	1580	53.29	340.03	0
STEENBRE	540	364	365	4672	27.14	27572	0
TENBARS1	18	1050	1051	2424	28.32	2295.4	0
TENBARS2	18	686	687	1696	18.66	2277.9	0
TRAINF	408	47	48	1154	6.39	3.0975	0
TRUSPYR1	11	1340	1341	4305	35.94	11.229	0
UBH5	1010	37	38	71	7.86	1.1163	0
WATER	31	32	33	161	1.08	10549	0
ZIGZAG	304	75	76	2501	10.31	33.787	0

Table 35: SBMIN with full factorization preconditioning on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	10	11	21	0.16	5.7444	0
ARWHEAD	100	5	6	9	0.14	0	0
ARWHEAD	500	5	6	7	0.32	1.3224e-09	0
BARD	3	13	14	45	0.21	0.0082149	0
BDQRTIC	100	12	13	68	0.31	378.77	0
BDQRTIC	500	12	13	78	0.86	1981	0
BEALE	2	9	10	19	0.15	5.4324e-13	0
BIGGS6	6	19	20	80	0.30	0.0056557	0
BOX3	3	7	8	21	0.12	1.641e-09	0
BRKMCC	2	4	5	9	0.08	0.16904	0
BROWNAL	10	4	5	10	0.08	1.1263e-10	0
BROWNBS	2	23	24	50	0.33	0	0
BROWNDEN	4	11	12	35	0.17	85822	0
BROYDN7D	10	20	21	105	0.30	1.2611	0
BROYDN7D	100	25	26	127	0.52	39.355	0
BROYDN7D	500	76	77	399	3.20	198.72	0
BRYBND	10	11	12	81	0.18	5.0386e-17	0
BRYBND	100	10	11	104	0.33	4.486e-13	0
BRYBND	500	12	13	142	1.27	1.2502e-12	0
CHNROSNB	10	27	28	159	0.41	1.7828e-13	0
CLIFF	2	28	29	34	0.42	0.19979	0
CRAGGLVY	100	13	14	177	0.39	32.27	0
CRAGGLVY	4	17	18	67	0.26	4.2291e-08	0
CRAGGLVY	500	13	14	179	1.06	167.45	0
CUBE	2	20	21	48	0.29	8.8122e-11	0
DENSCHNA	2	5	6	11	0.09	6.6698e-14	0
DENSCHNB	2	5	6	8	0.09	7.604e-16	0
DENSCHNC	2	9	10	17	0.15	8.7828e-13	0
DENSCHND	3	28	29	89	0.41	1.0203e-07	0
DENSCHNE	3	16	17	23	0.24	1.3646e-12	0
DENSCHNF	2	6	7	16	0.11	2.8929e-18	0
DIXMAANA	15	7	8	18	0.09	1	0
DIXMAANA	90	6	7	18	0.11	1	0
DIXMAANA	300	6	7	18	0.21	1	0
DIXMAANB	15	6	7	19	0.08	1	0
DIXMAANB	90	6	7	20	0.12	1	0
DIXMAANB	300	6	7	19	0.22	1	0
DIXMAANC	15	7	8	21	0.09	1	0
DIXMAANC	90	7	8	21	0.13	1	0
DIXMAANC	300	7	8	22	0.24	1	0
DIXMAAND	15	8	9	25	0.10	1	0
DIXMAAND	90	8	9	25	0.14	1	0

Table 36: Unpreconditioned DXZ on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	8	9	26	0.26	1	0
DIXMAANE	15	7	8	36	0.10	1	0
DIXMAANE	90	12	13	83	0.23	1	0
DIXMAANE	300	11	12	124	0.44	1	0
DIXMAANF	15	11	12	45	0.14	1	0
DIXMAANF	90	13	14	83	0.24	1	0
DIXMAANF	300	14	15	128	0.59	1	0
DIXMAANG	15	12	13	47	0.14	1	0
DIXMAANG	90	32	33	130	0.45	1	0
DIXMAANG	300	12	13	122	0.54	1	0
DIXMAANH	15	12	13	48	0.14	1	0
DIXMAANH	90	13	14	83	0.24	1	0
DIXMAANH	300	19	20	142	0.66	1	0
DIXMAANI	15	7	8	64	0.10	1	0
DIXMAANI	90	8	9	290	0.29	1	0
DIXMAANI	300	8	9	897	1.60	1	0
DIXMAANJ	15	12	13	85	0.15	1	0
DIXMAANJ	90	20	21	213	0.39	1	0
DIXMAANJ	300	22	23	597	1.54	1	0
DIXMAANK	15	18	19	77	0.20	1	0
DIXMAANK	90	34	35	310	0.60	1	0
DIXMAANK	300	26	27	626	1.68	1	0
DIXMAANL	15	12	13	69	0.14	1	0
DIXMAANL	90	24	25	277	0.46	1	0
DIXMAANL	300	27	28	672	1.75	1	0
DIXON3DQ	10	3	4	27	0.07	5.3002e-31	0
DJTL	2	69	70	115	0.92	-8951.5	3
DQDRTIC	10	2	3	2	0.04	1.6602e-23	0
DQDRTIC	100	2	3	2	0.08	1.6602e-23	0
DQDRTIC	500	2	3	2	0.21	1.6602e-23	0
DQRTIC	100	26	27	116	0.50	4.9878e-07	0
DQRTIC	500	33	34	195	1.39	6.084e-07	0
EDENSCH	36	14	15	48	0.26	219.28	0
EIGENALS	110	14	15	125	0.62	1.2658e-10	0
EIGENALS	420	25	26	406	9.43	1.1461e-09	0
EIGENBLS	110	121	122	2393	11.45	2.2155e-10	0
EIGENBLS	420	257	258	10576	360.52	2.2677e-06	0
EIGENCLS	462	92	93	3459	136.52	5.1269e-11	0
ENGVAL1	100	7	8	27	0.18	109.09	0
ENGVAL1	2	7	8	17	0.12	0	0
ERRINROS	10	48	49	301	0.70	6.6946	0
ERRINROS	50	62	63	706	1.17	39.904	0

Table 37: Unpreconditioned DXZ on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	25	0.20	0.24051	0
EXTROSNB	5	32	33	155	0.48	2.6287e-10	0
FLETCBV2	100	1	2	101	0.12	-0.51401	0
FLETCBV3	100	10000	10001	19788	178.55	-159390	1
FLETCHBV	10	163	164	365	2.10	-2.6554e+06	0
FLETCHBV	100	10000	10001	19813	184.24	-1.5829e+13	1
FLETCHCR	10	27	28	182	0.43	2.5153e-11	0
FLETCHCR	100	144	145	1589	3.13	2.7032e-14	0
FMINSURF	121	80	81	258	1.78	1	0
FMINSURF	16	130	131	456	1.79	1	0
FREUROTH	100	9	10	39	0.23	11965	0
FREUROTH	2	9	10	21	0.14	48.984	0
FREUROTH	50	9	10	39	0.18	5881	0
FREUROTH	500	9	10	39	0.54	60634	0
GENROSE	10	26	27	161	0.38	1	0
GENROSE	100	108	109	649	2.03	1	0
GENROSE	500	539	540	3418	19.75	1	0
GROWTHLS	3	178	179	615	2.50	1.004	0
GULF	3	23	24	56	0.43	1.066e-09	0
HAIRY	2	559	560	949	4.13	20	0
HATFLDD	3	23	24	77	0.35	6.8282e-08	0
HATFLDE	3	17	18	53	0.26	5.1471e-07	0
HEART6LS	6	1624	1625	5299	22.02	8.6109e-11	0
HELIX	3	14	15	40	0.20	1.8886e-14	0
HILBERTA	2	2	3	2	0.04	6.656e-31	0
HILBERTB	5	2	3	2	0.04	1.5953e-29	0
HIMMELBB	2	26	27	32	0.36	5.1236e-22	0
HIMMELBF	4	143	144	640	1.96	318.57	0
HIMMELBG	2	8	9	12	0.08	7.139e-13	0
HIMMELBH	2	1	2	1	0.02	-1	0
HYDC20LS	0	—	—	—	—	—	6
JENSMP	2	9	10	23	0.13	124.36	0
KOWOSB	4	14	15	57	0.22	0.0003078	0
LIARWHD	100	10	11	28	0.22	1.2325e-15	0
LIARWHD	36	10	11	26	0.18	4.3062e-17	0
LIARWHD	500	11	12	29	0.50	4.4222e-19	0
LOGROS	2	160	161	210	1.91	0	0
MANCINO	100	11	12	24	11.29	4.3367e-17	0
MOREBV	10	3	4	30	0.06	2.6552e-12	0
MOREBV	100	5	6	1227	0.72	6.7615e-07	0
MOREBV	500	2	3	401	1.16	9.4938e-09	0
MSQRTALS	100	68	69	1129	4.75	1.2687e-10	0

Table 38: Unpreconditioned DXZ on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	50	0.23	5.0588e-10	0
MSQRTALS	49	544	545	72533	77.60	0.00039815	0
MSQRTBLS	100	114	115	4408	14.87	1.7529e-10	0
MSQRTBLS	49	57	58	724	1.67	1.5667e-11	0
MSQRTBLS	9	16	17	62	0.25	4.6657e-12	0
NCB20B	100	31	32	1192	6.39	196.68	0
NCB20B	50	11	12	259	0.65	99.504	0
NCB20B	500	22	23	1325	48.21	897.52	0
NONDIA	100	13	14	25	0.27	4.6108e-19	0
NONDIA	50	11	12	21	0.21	1.5573e-14	0
NONDIA	500	14	15	28	0.56	3.3759e-15	0
NONDQUAR	100	38	39	749	0.91	1.6738e-06	0
NONDQUAR	500	49	50	967	2.94	2.53e-06	0
NONMSQRT	100	160	161	8016	24.14	18.057	0
NONMSQRT	49	115	116	4025	5.54	1.0755	0
NONMSQRT	9	31	32	175	0.48	0.75195	0
OSBORNEA	0	—	—	—	—	—	6
OSBORNEB	0	—	—	—	—	—	6
PALMER1C	8	74	75	1627	1.27	0.097605	0
PALMER1D	7	34	35	468	0.56	0.65267	0
PALMER2C	8	16	17	262	0.28	0.01437	0
PALMER3C	8	49	50	992	0.85	0.019538	0
PALMER4C	8	37	38	719	0.64	0.050311	0
PENALTY1	10	19	20	27	0.29	7.1153e-05	0
PENALTY1	100	33	34	50	0.61	0.00090254	0
PENALTY1	50	29	30	47	0.50	0.00043227	0
PENALTY1	500	39	40	55	2.40	0.0047791	0
PENALTY2	10	16	17	50	0.25	0.00029403	0
PENALTY2	100	18	19	168	0.51	97096	0
PENALTY2	50	23	24	129	0.44	4.2961	0
PENALTY3	100	21	22	83	16.36	0.001	0
PENALTY3	50	15	16	66	2.51	0.001	0
PFIT1LS	3	297	298	898	3.99	6.8547e-07	0
POWELLSG	100	15	16	74	0.29	1.4205e-07	0
POWELLSG	500	15	16	74	0.57	7.1025e-07	0
POWELLSG	20	15	16	73	0.24	3.5465e-08	0
POWELLSG	4	15	16	72	0.23	1.1266e-08	0
POWER	10	16	17	67	0.26	3.1417e-08	0
POWER	100	22	23	207	0.47	1.4132e-08	0
POWER	50	20	21	141	0.35	2.3657e-08	0
POWER	500	26	27	453	1.47	1.0025e-08	0
QUARTC	100	26	27	116	0.47	4.9878e-07	0

Table 39: Unpreconditioned DXZ on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	55	0.35	8.3381e-08	0
QUARTC	500	33	34	195	1.34	6.084e-07	0
ROSENBR	2	26	27	63	0.37	1.317e-12	0
S308	2	9	10	19	0.14	0.7732	0
SCHMVETT	10	3	4	28	0.05	-24	0
SCHMVETT	500	3	4	50	0.56	-1494	0
SCHMVETT	3	3	4	11	0.04	-3	0
SCHMVETT	500	3	4	50	0.53	-1494	0
SINQUAD	100	25	26	71	0.49	9.0864e-07	0
SINQUAD	5	14	15	48	0.22	8.3999e-08	0
SINQUAD	50	28	29	91	0.49	1.9122e-07	0
SINQUAD	500	38	39	96	1.60	1.0312e-06	0
SISSER	2	12	13	17	0.20	1.3906e-08	0
SNAIL	2	100	101	241	0.90	1.1242e-12	0
SPMSRTLS	100	34	35	251	0.87	1.1959e-11	0
SPMSRTLS	28	11	12	62	0.21	4.0138e-11	0
SPMSRTLS	499	45	46	287	3.03	2.4186e-11	0
SROSENBR	10	10	11	30	0.16	6.6723e-14	0
SROSENBR	100	10	11	30	0.20	6.6723e-13	0
SROSENBR	50	10	11	30	0.17	3.3361e-13	0
SROSENBR	500	10	11	30	0.42	3.3361e-12	0
TOINTGOR	50	8	9	125	0.20	1373.9	0
TOINTGSS	10	49	50	202	0.46	12.5	0
TOINTGSS	100	14	15	58	0.26	10.204	0
TOINTGSS	50	132	133	455	1.52	10.417	0
TOINTGSS	500	12	13	34	0.40	10.04	0
TOINTPSP	50	51	52	182	0.80	225.56	0
TOINTQOR	50	5	6	39	0.12	1175.5	0
TQUARTIC	100	11	12	19	0.23	4.3582e-12	0
TQUARTIC	5	9	10	17	0.15	9.1239e-19	0
TQUARTIC	50	9	10	17	0.16	9.6241e-10	0
TQUARTIC	500	12	13	26	0.51	4.4191e-15	0
TRIDIA	10	5	6	29	0.10	5.687e-12	0
TRIDIA	100	4	5	95	0.15	8.5487e-14	0
TRIDIA	50	4	5	79	0.12	9.9326e-14	0
TRIDIA	500	4	5	95	0.42	8.5487e-14	0
VARDIM	10	14	15	14	0.21	1.595e-26	0
VARDIM	100	25	26	25	0.42	5.171e-26	0
VARDIM	50	22	23	22	0.34	1.2641e-27	0
VARDIM	500	33	34	33	0.87	1.1634e-25	0
VAREIGVL	10	10	11	55	0.17	2.3225e-10	0
VAREIGVL	100	11	12	92	0.31	1.5303e-08	0

Table 40: Unpreconditioned DXZ on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	11	12	120	0.26	9.1854e-09	0
VAREIGVL	500	12	13	110	0.89	1.7608e-08	0
VIBRBEAM	8	712	713	5247	15.24	7.6211	0
WATSON	12	9	10	50	0.20	9.3046e-08	0
WATSON	31	9	10	53	0.24	3.0439e-08	0
WOODS	100	16	17	64	0.35	1.6135e-15	0
WOODS	4	16	17	56	0.24	1.7832e-17	0
WOODS	500	16	17	65	0.63	2.5478e-15	0
YFITU	3	43	44	140	0.63	1.6235e-07	0
ZANGWIL2	2	1	2	1	0.03	-18.2	0
PFIT2LS	3	39	40	74	0.55	1.6531e-11	0
PFIT3LS	3	44	45	91	0.64	6.9145e-10	0
PFIT4LS	3	268	269	764	3.75	6.7232e-09	0
EXTROSNB	10	261	262	2392	3.88	2.4533e-06	0
EXTROSNB	50	276	277	2783	4.81	3.7042e-06	0
EXTROSNB	100	215	216	2120	4.35	4.0504e-06	0

Table 41: Unpreconditioned DXZ on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	7	0.61	1.6903e-10	0
ARWHEAD	5000	5	6	7	4.48	1.11e-12	0
BDQRTIC	1000	12	13	78	1.63	3983.8	0
BROYDN7D	1000	147	148	673	9.52	383.58	0
BRYBND	1000	15	16	182	3.09	3.7859e-13	0
BRYBND	5000	19	20	201	18.51	1.076e-12	0
CRAGGLVY	1000	13	14	179	2.01	336.42	0
CRAGGLVY	5000	13	14	179	10.93	1688.2	0
DIXMAANA	1500	6	7	18	0.82	1	0
DIXMAANA	3000	6	7	18	1.64	1	0
DIXMAANB	1500	6	7	19	0.87	1	0
DIXMAANB	3000	6	7	19	1.75	1	0
DIXMAANC	1500	7	8	22	0.93	1	0
DIXMAANC	3000	7	8	22	1.87	1	0
DIXMAAND	1500	8	9	27	1.02	1	0
DIXMAAND	3000	8	9	26	2.01	1	0
DIXMAANE	1500	11	12	217	2.65	1	0
DIXMAANE	3000	11	12	306	7.03	1	0
DIXMAANF	1500	19	20	242	3.48	1	0
DIXMAANF	3000	38	39	407	12.00	1	0
DIXMAANG	1500	29	30	292	4.40	1	0
DIXMAANG	3000	25	26	349	9.85	1	0
DIXMAANH	1500	20	21	224	3.38	1	0
DIXMAANH	3000	21	22	305	8.70	1	0
DIXMAANI	1500	20	21	5650	47.60	1	0
DIXMAANI	3000	22	23	7455	133.39	1	0
DIXMAANJ	1500	71	72	4405	45.39	1	0
DIXMAANJ	3000	85	86	5067	111.87	1	0
DIXMAANK	1500	71	72	4177	43.47	1	0
DIXMAANK	3000	103	104	4345	97.87	1	0
DIXMAANL	1500	59	60	2335	25.27	1	0
DIXMAANL	3000	96	97	3760	85.30	1	0
DQDRTIC	1000	2	3	2	0.39	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.79	1.6602e-23	0
DQRTIC	1000	35	36	258	2.56	3.7687e-06	0
DQRTIC	5000	42	43	410	15.91	6.9762e-06	0
EDENSCH	2000	14	15	50	2.31	12003	0
EIGENALS	930	35	36	877	66.55	3.4113e-10	0
EIGENBLS	930	278	279	12490	1469.12	1.2778e-05	0
ENGVAL1	1000	7	8	27	0.70	1108.2	0
ENGVAL1	5000	7	8	27	3.36	5548.7	0
FLETCBV2	1000	0	1	0	0.31	-0.50134	0

Table 42: Unpreconditioned DXZ on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	20632	605.64	-1.6861e+09	1
FMINSURF	1024	214	215	736	41.68	1	0
FMINSURF	5625	576	577	2094	1515.87	1	0
FREUROTH	1000	9	10	39	0.92	121470	0
FREUROTH	5000	9	10	39	4.50	608160	0
LIARWHD	1000	13	14	27	0.87	2.3011e-16	0
LIARWHD	5000	13	14	23	3.85	6.0958e-16	0
MOREBV	1000	2	3	267	1.59	2.0186e-09	0
MOREBV	5000	1	2	76	3.84	3.0225e-10	0
MSQRTALS	1024	110	111	9702	1290.95	2.2437e-09	0
MSQRTALS	529	164	165	15073	580.16	1.9365e-08	0
MSQRTBLS	529	85	86	5421	216.24	7.6463e-10	0
MSQRTBLS	1024	104	105	6317	862.23	1.3434e-10	0
NCB20B	1000	24	25	1316	95.15	1676	0
NONDIA	1000	15	16	29	0.96	2.468e-14	0
NONDIA	5000	14	15	27	4.05	6.039e-08	0
NONDIA	10000	14	15	27	8.19	6.2784e-08	0
NONDQUAR	1000	54	55	1135	5.59	2.3435e-06	0
NONDQUAR	5000	95	96	1402	36.88	5.1382e-06	0
NONDQUAR	10000	75	76	1202	69.11	6.5888e-06	0
NONMSQRT	529	316	317	102692	3240.75	61.327	0
PENALTY1	1000	45	46	69	7.03	0.0096862	0
POWELLSG	1000	15	16	75	0.94	1.1167e-06	0
POWELLSG	5000	15	16	75	4.06	5.5837e-06	0
POWELLSG	10000	15	16	77	8.67	1.1167e-05	0
POWER	1000	28	29	641	3.24	5.8399e-09	0
QUARTC	1000	35	36	258	2.57	3.7687e-06	0
QUARTC	5000	42	43	410	15.96	6.9762e-06	0
QUARTC	10000	45	46	511	37.93	8.6633e-06	0
SCHMVETT	1000	3	4	50	1.07	-2994	0
SCHMVETT	5000	3	4	49	5.24	-14994	0
SCHMVETT	10000	3	4	50	10.76	-29994	0
SINQUAD	1000	46	47	118	3.34	6.2178e-06	0
SINQUAD	5000	84	85	205	42.52	1.0637e-05	0
SINQUAD	10000	111	112	279	127.29	1.2282e-05	0
SPMSRTLS	1000	84	85	934	13.88	2.857e-11	0
SPMSRTLS	4999	127	128	2251	158.75	3.3103e-11	0
SPMSRTLS	10000	252	253	42267	5271.24	0.72632	0
SROSENBR	1000	10	11	30	0.66	6.6723e-12	0
SROSENBR	5000	10	11	30	2.97	3.3361e-11	0
SROSENBR	10000	10	11	30	6.03	6.6723e-11	0
TESTQUAD	1000	4	5	26	0.49	2.6707e-12	0

Table 43: Unpreconditioned DXZ on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	6	7	21	0.52	10.01	0
TOINTGSS	5000	7	8	23	3.09	10.002	0
TOINTGSS	10000	7	8	22	6.20	10.001	0
TQUARTIC	1000	13	14	27	0.87	1.0168e-16	0
TQUARTIC	5000	12	13	24	5.73	7.2373e-08	0
TQUARTIC	10000	12	13	24	15.95	1.793e-08	0
TRIDIA	1000	4	5	95	0.75	8.5487e-14	0
TRIDIA	5000	4	5	95	3.65	8.5488e-14	0
TRIDIA	10000	4	5	95	7.79	8.5491e-14	0
VARDIM	1000	36	37	36	1.40	1.1203e-20	0
VARDIM	5000	45	46	45	6.69	1.1459e-18	0
VAREIGVL	1000	12	13	136	1.83	5.8152e-08	0
VAREIGVL	5000	13	14	115	10.97	7.6187e-08	0
WOODS	1000	16	17	65	1.04	5.0956e-15	0
WOODS	10000	16	17	66	10.41	4.7618e-14	0
FLETCHCR	1000	1302	1303	15344	105.76	6.1804e-14	0
GENROSE	1000	1019	1020	6141	58.32	1	0

Table 44: Unpreconditioned DXZ on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	40	41	3827	11.80	0	0
CATENARY	501	628	629	129332	354.44	-348400	0
CHANDHEQ	100	13	14	135	4.80	6.9121e-08	0
CHEMRCTA	100	10000	10001	3010000	2048.85	0.33624	8
CHEMRCTB	1000	—	—	—	—	—	6
CLPLATEC	5041	2	3	5634	220.64	-0.0050207	0
CORKSCRW	456	1296	1297	1413621	2120.33	26.484	0
DALLASM	196	278	279	136063	140.93	-48198	0
DISCS	36	4365	4366	733914	654.37	21.376	0
DRUGDIS	304	10000	10001	7037995	13672.15	4.3234	1
DTOC5	9999	29	30	100332	6744.70	1.5316	0
EXPFITB	5	55	56	1937	2.46	0.0050193	0
EXPFITC	5	80	81	5005	18.35	0.023303	0
FCCU	19	16	17	102	0.31	11.149	0
FLETCHER	4	26	27	126	0.44	19.525	0
GILBERT	500	27	28	55	1.61	237.37	0
GRIDNETA	3444	28	29	6766	102.01	161.61	0
GRIDNETE	3444	16	17	5038	125.85	144.06	0
HADAMARD	257	80	81	184	5.79	0.343	8
HAGER3	2001	6	7	4969	66.72	0.14096	0
HAGER4	2001	9	10	163878	1283.87	2.7942	0
HS114	10	2300	2301	52944	39.87	-1768.8	0
HS59	2	410	411	1609	5.81	-7.8028	0
HS75	4	945	946	14117	14.69	5174.4	0
HVYCRASH	204	10000	10001	4525629	5121.43	1.6414e-07	1
HYDROELL	1009	137	138	48621	246.04	-3.5855e+06	0
JUNKTURN	5010	87	88	106688	4552.81	9.4167e-06	0
KSIP	20	47	48	3086	29.59	0.57579	0
LINVERSE	1999	17	18	1490	45.04	682	0
LMINSURF	1024	500	501	1904	34.24	9	0
MANNE	300	7	8	424	1.43	-0.97457	0
MEYER3	3	360	361	1123	5.05	87.946	0
MINPERM	51	10	11	54	0.30	0.0384	0
MISTAKE	9	27	28	295	0.49	-1	0
NGONE	50	1018	1019	51682	159.63	-0.64103	0
NLMSURF	1024	1508	1509	7161	113.84	38.591	0
NYSTROM5	18	20	21	179	0.37	5.9386e-08	0
ODC	10404	19	20	1527	179.56	-0.0040122	0
OET1	3	43	44	1750	10.87	0.53824	0
OPTCTRL3	122	50	51	3387	3.13	2048	0
ORTHREGA	2053	179	180	2188	72.36	5661.4	0
ORTHREGC	5005	42	43	987	81.45	94.813	0

Table 45: Unpreconditioned DXZ on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	31	32	149	0.80	15.59	0
ORTHREGF	1205	38	39	393	6.68	16.201	0
PRODPL1	60	44	45	1310	1.06	35.739	0
QR3D	610	248	249	20208	515.14	2.0826e-08	0
QR3DBD	457	117	118	5402	88.10	5.7345e-10	0
READING1	202	331	332	97466	122.60	-0.16049	0
SEMICON1	102	—	—	—	—	—	6
SEMICON2	1002	392	393	928706	5093.52	0.00032949	8
SIPOW1	2	49	50	1222	17.99	-1	0
SPANHYD	97	18	19	584	0.63	239.74	0
SSC	10404	1	2	133	34.53	-2.0782	0
SSEBNLN	194	61	62	3340	2.92	1.6171e+07	0
SSNLBEAM	3003	—	—	—	—	—	6
STEENBRE	540	3110	3111	803128	764.25	27459	0
TENBARS1	18	254	255	3548	4.33	2295.4	0
TENBARS2	18	160	161	1764	2.65	2277.9	0
TRAINF	408	34	35	32374	38.77	3.0975	0
TRUSPYR1	11	540	541	2838	7.91	11.229	0
UBH5	1000	—	—	—	—	—	6
WATER	31	34	35	510	0.63	10549	0
ZIGZAG	304	170	171	131333	137.94	33.787	0

Table 46: Unpreconditioned DXZ on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.14	5.7444	0
ARWHEAD	100	5	6	7	0.14	0	0
ARWHEAD	500	5	6	6	0.37	1.3237e-09	0
BARD	3	7	8	13	0.13	0.0082149	0
BDQRTIC	100	11	12	23	0.29	378.77	0
BDQRTIC	500	11	12	24	0.81	1981	0
BEALE	2	7	8	14	0.12	2.9425e-14	0
BIGGS6	6	47	48	106	0.70	5.2722e-12	0
BOX3	3	7	8	13	0.12	1.9221e-11	0
BRKMCC	2	3	4	5	0.06	0.16904	0
BROWNAL	10	5	6	42	0.11	9.2726e-11	0
BROWNBS	2	34	35	50	0.49	1.9722e-31	0
BROWNDEN	4	11	12	20	0.18	85822	0
BROYDN7D	10	16	17	32	0.25	1.2611	0
BROYDN7D	100	32	33	72	0.69	30.494	0
BROYDN7D	500	61	62	137	2.88	171.92	0
BRYBND	10	12	13	37	0.20	1.6913e-16	0
BRYBND	100	12	13	38	0.37	1.143e-12	0
BRYBND	500	16	17	44	1.32	2.5785e-13	0
CHNROSNB	10	20	21	40	0.32	2.7163e-17	0
CLIFF	2	27	28	30	0.39	0.19979	0
CRAGGLVY	100	14	15	25	0.34	32.27	0
CRAGGLVY	4	16	17	30	0.26	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.83	167.45	0
CUBE	2	14	15	25	0.21	3.763e-12	0
DENSCHNA	2	5	6	9	0.09	1.2e-15	0
DENSCHNB	2	3	4	5	0.06	0	0
DENSCHNC	2	9	10	13	0.14	1.8423e-13	0
DENSCHND	3	36	37	68	0.51	1.8846e-08	0
DENSCHNE	3	11	12	16	0.17	2.4642e-12	0
DENSCHNF	2	6	7	12	0.11	6.5139e-22	0
DIXMAANA	15	5	6	9	0.07	1	0
DIXMAANA	90	5	6	14	0.11	1	0
DIXMAANA	300	5	6	14	0.23	1	0
DIXMAANB	15	6	7	11	0.08	1	0
DIXMAANB	90	8	9	18	0.15	1	0
DIXMAANB	300	7	8	13	0.27	1	0
DIXMAANC	15	9	10	15	0.11	1	0
DIXMAANC	90	9	10	16	0.17	1	0
DIXMAANC	300	19	20	36	0.53	1	0
DIXMAAND	15	11	12	21	0.13	1	0
DIXMAAND	90	10	11	21	0.18	1	0

Table 47: DXZ with band preconditioning on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.38	1	0
DIXMAANE	15	6	7	12	0.08	1	0
DIXMAANE	90	6	7	16	0.13	1	0
DIXMAANE	300	6	7	16	0.25	1	0
DIXMAANF	15	10	11	20	0.12	1	0
DIXMAANF	90	19	20	39	0.29	1	0
DIXMAANF	300	31	32	65	0.85	1	0
DIXMAANG	15	16	17	31	0.17	1	0
DIXMAANG	90	22	23	43	0.34	1	0
DIXMAANG	300	20	21	37	0.61	1	0
DIXMAANH	15	10	11	19	0.12	1	0
DIXMAANH	90	20	21	42	0.32	1	0
DIXMAANH	300	26	27	51	0.73	1	0
DIXMAANI	15	5	6	11	0.07	1	0
DIXMAANI	90	8	9	23	0.16	1	0
DIXMAANI	300	8	9	19	0.29	1	0
DIXMAANJ	15	12	13	25	0.14	1	0
DIXMAANJ	90	20	21	41	0.32	1	0
DIXMAANJ	300	21	22	45	0.61	1	0
DIXMAANK	15	11	12	20	0.13	1	0
DIXMAANK	90	18	19	38	0.29	1	0
DIXMAANK	300	58	59	115	1.40	1	0
DIXMAANL	15	10	11	19	0.11	1	0
DIXMAANL	90	19	20	40	0.31	1	0
DIXMAANL	300	40	41	82	1.02	1	0
DIXON3DQ	10	2	3	4	0.05	0	0
DJTL	2	126	127	173	1.71	-8951.5	0
DQDRTIC	10	2	3	2	0.05	1.6602e-23	0
DQDRTIC	100	2	3	2	0.08	1.6602e-23	0
DQDRTIC	500	2	3	2	0.23	1.6602e-23	0
DQRTIC	100	26	27	47	0.51	4.5801e-07	0
DQRTIC	500	33	34	59	1.32	5.8379e-07	0
EDENSCH	36	12	13	21	0.22	219.28	0
EIGENALS	110	21	22	69	1.05	1.2125e-12	0
EIGENALS	420	30	31	119	13.02	5.2925e-11	0
EIGENBLS	110	169	170	2066	16.19	4.3457e-10	0
EIGENBLS	420	363	364	8185	425.39	4.1287e-07	0
EIGENCLS	462	294	295	3511	287.19	5.1259e-10	0
ENGVAL1	100	7	8	14	0.18	109.09	0
ENGVAL1	2	7	8	12	0.11	0	0
ERRINROS	10	29	30	51	0.43	7.195	0
ERRINROS	50	43	44	76	0.74	39.904	0

Table 48: DXZ with band preconditioning on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.19	0.24051	0
EXTROSNB	5	27	28	53	0.41	1.6025e-09	0
FLETCBV2	100	1	2	2	0.07	-0.51401	0
FLETCBV3	100	10000	10001	17848	196.30	-162930	1
FLETCHBV	10	129	130	249	1.61	-2.7201e+06	0
FLETCHBV	100	10000	10001	17175	203.61	-1.6527e+13	1
FLETCHCR	10	24	25	48	0.36	1.1979e-19	0
FLETCHCR	100	142	143	284	2.62	7.3832e-19	0
FMINSURF	121	116	117	294	3.37	1	0
FMINSURF	16	80	81	156	1.13	1	0
FREUROTH	100	8	9	15	0.21	11965	0
FREUROTH	2	9	10	14	0.14	48.984	0
FREUROTH	50	8	9	15	0.17	5881	0
FREUROTH	500	8	9	15	0.52	60634	0
GENROSE	10	29	30	56	0.42	1	0
GENROSE	100	108	109	226	1.96	1	0
GENROSE	500	478	479	1023	16.57	1	0
GROWTHLS	3	134	135	233	1.89	1.004	0
GULF	3	33	34	63	0.65	3.6055e-15	0
HAIRY	2	767	768	1297	5.69	20	0
HATFLDD	3	25	26	49	0.37	6.6151e-08	0
HATFLDE	3	22	23	43	0.35	5.1204e-07	0
HEART6LS	6	2589	2590	5581	36.47	2.2149e-10	0
HELIX	3	8	9	16	0.12	9.2334e-22	0
HILBERTA	2	2	3	2	0.04	6.656e-31	0
HILBERTB	5	2	3	2	0.03	1.5953e-29	0
HIMMELBB	2	13	14	16	0.20	5.8042e-16	0
HIMMELBF	4	101	102	334	1.45	318.57	0
HIMMELBG	2	8	9	11	0.08	5.1108e-17	0
HIMMELBH	2	1	2	1	0.02	-1	0
HYDC20LS	99	10000	10001	1067016	2456.29	0.073153	1
JENSMP	2	9	10	14	0.15	124.36	0
KOWOSB	4	8	9	16	0.13	0.0003078	0
LIARWHD	100	13	14	37	0.29	9.0888e-21	0
LIARWHD	36	10	11	32	0.19	1.1625e-16	0
LIARWHD	500	15	16	36	0.76	3.7352e-14	0
LOGROS	2	161	162	186	1.92	2.2204e-16	0
MANCINO	100	15	16	23	17.41	9.2449e-18	0
MOREBV	10	2	3	4	0.05	6.582e-14	0
MOREBV	100	1	2	2	0.07	7.887e-10	0
MOREBV	500	1	2	2	0.21	5.9316e-12	0
MSQRTALS	100	31	32	300	2.16	3.8831e-10	0

Table 49: DXZ with band preconditioning on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.23	6.2623e-12	0
MSQRTALS	49	650	651	89791	112.00	0.00039547	0
MSQRTBLS	100	64	65	635	4.39	3.788e-10	0
MSQRTBLS	49	344	345	44237	55.69	0.00057296	0
MSQRTBLS	9	13	14	35	0.21	5.0127e-13	0
NCB20B	100	19	20	905	5.22	196.68	0
NCB20B	50	20	21	536	1.45	99.504	0
NCB20B	500	18	19	842	33.54	897.52	0
NONDIA	100	16	17	35	0.33	1.4261e-20	0
NONDIA	50	13	14	29	0.25	5.255e-14	0
NONDIA	500	15	16	36	0.72	3.013e-16	0
NONDQUAR	100	15	16	37	0.33	2.2854e-09	0
NONDQUAR	500	16	17	36	0.71	3.9386e-09	0
NONMSQRT	100	10000	10001	2966743	8537.15	18.071	1
NONMSQRT	49	10000	10001	1332589	1581.76	1.0762	1
NONMSQRT	9	44	45	108	0.66	0.75194	0
OSBORNEA	0	—	—	—	—	—	6
OSBORNEB	11	16	17	75	0.46	0.040138	0
PALMER1C	8	20	21	174	0.37	0.097605	0
PALMER1D	7	14	15	56	0.25	0.65267	0
PALMER2C	8	19	20	200	0.34	0.014369	0
PALMER3C	8	11	12	78	0.20	0.019539	0
PALMER4C	8	24	25	215	0.43	0.050312	0
PENALTY1	10	23	24	69	0.36	7.0993e-05	0
PENALTY1	100	33	34	243	0.89	0.00090254	0
PENALTY1	50	31	32	246	0.66	0.00043182	0
PENALTY1	500	39	40	217	5.04	0.0047791	0
PENALTY2	10	27	28	109	0.43	0.00029387	0
PENALTY2	100	19	20	87	0.56	97096	0
PENALTY2	50	23	24	117	0.50	4.2961	0
PENALTY3	100	19	20	44	18.30	0.00099999	0
PENALTY3	50	21	22	56	4.01	0.001	0
PFIT1LS	3	328	329	753	4.49	6.0972e-07	0
POWELLSG	100	15	16	30	0.31	2.1902e-07	0
POWELLSG	500	15	16	30	0.64	1.1139e-06	0
POWELLSG	20	15	16	30	0.25	4.0054e-08	0
POWELLSG	4	15	16	30	0.22	4.2527e-09	0
POWER	10	16	17	40	0.25	1.1098e-08	0
POWER	100	22	23	66	0.49	5.0264e-09	0
POWER	50	19	20	54	0.34	2.3411e-08	0
POWER	500	26	27	78	2.47	5.9786e-09	0
QUARTC	100	26	27	47	0.51	4.5801e-07	0

Table 50: DXZ with band preconditioning on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.33	5.2022e-08	0
QUARTC	500	33	34	59	1.34	5.8379e-07	0
ROSENBR	2	26	27	45	0.37	1.0148e-14	0
S308	2	9	10	15	0.15	0.7732	0
SCHMVETT	10	3	4	6	0.05	-24	0
SCHMVETT	500	3	4	6	0.36	-1494	0
SCHMVETT	3	3	4	6	0.05	-3	0
SCHMVETT	500	3	4	6	0.37	-1494	0
SINQUAD	100	37	38	116	0.86	9.1525e-08	0
SINQUAD	5	11	12	22	0.18	1.1721e-08	0
SINQUAD	50	40	41	147	0.76	5.3756e-08	0
SINQUAD	500	64	65	202	3.67	1.6865e-08	0
SISSER	2	12	13	19	0.18	1.1139e-08	0
SNAIL	2	85	86	160	0.78	5.3926e-14	0
SPMSRTLS	100	24	25	48	0.60	2.8438e-17	0
SPMSRTLS	28	41	42	81	0.65	2.1195e-14	0
SPMSRTLS	499	53	54	107	3.25	0.062928	0
SROSENBR	10	6	7	10	0.11	4.6748e-17	0
SROSENBR	100	6	7	10	0.15	4.6748e-16	0
SROSENBR	50	6	7	10	0.12	2.3374e-16	0
SROSENBR	500	10	11	20	0.48	2.9154e-13	0
TOINTGOR	50	9	10	84	0.21	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.07	10	0
TOINTGSS	50	2	3	4	0.05	10	0
TOINTGSS	500	2	3	4	0.24	10	0
TOINTPSP	50	72	73	180	1.14	225.56	0
TOINTQOR	50	6	7	30	0.14	1175.5	0
TQUARTIC	100	13	14	34	0.28	2.4906e-15	0
TQUARTIC	5	1	2	2	0.03	4.4373e-31	0
TQUARTIC	50	12	13	38	0.22	1.468e-18	0
TQUARTIC	500	16	17	41	0.77	6.3145e-15	0
TRIDIA	10	1	2	2	0.04	1.0805e-30	0
TRIDIA	100	2	3	3	0.09	1.352e-32	0
TRIDIA	50	2	3	3	0.07	1.352e-32	0
TRIDIA	500	2	3	3	0.26	1.3482e-32	0
VARDIM	10	14	15	14	0.22	1.595e-26	0
VARDIM	100	25	26	25	0.58	5.171e-26	0
VARDIM	50	22	23	22	0.39	1.2641e-27	0
VARDIM	500	33	34	33	5.03	1.1634e-25	0
VAREIGVL	10	19	20	42	0.30	3.2786e-16	0
VAREIGVL	100	12	13	84	0.39	3.3727e-09	0

Table 51: DXZ with band preconditioning on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.30	2.9295e-10	0
VAREIGVL	500	12	13	63	1.57	2.0175e-08	0
VIBRBEAM	8	118	119	425	2.51	7.25	0
WATSON	12	8	9	44	0.22	7.76e-08	0
WATSON	31	10	11	57	0.37	5.0956e-08	0
WOODS	100	15	16	28	0.32	2.0135e-17	0
WOODS	4	15	16	28	0.24	8.0539e-19	0
WOODS	500	16	17	31	0.72	9.8289e-15	0
YFITU	3	32	33	70	0.49	1.5831e-12	0
ZANGWIL2	2	1	2	1	0.03	-18.2	0
PFIT2LS	3	268	269	497	3.62	1.258e-11	0
PFIT3LS	3	103	104	171	1.40	1.041e-12	0
PFIT4LS	3	35	36	56	0.51	2.288e-11	0
EXTROSNB	10	555	556	1254	7.62	7.7171e-09	0
EXTROSNB	50	1011	1012	2020	15.32	1.4881e-07	0
EXTROSNB	100	287	288	572	4.93	1.3092e-06	0

Table 52: DXZ with band preconditioning on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.70	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.06	1.11e-12	0
BDQRTIC	1000	11	12	24	1.55	3983.8	0
BROYDN7D	1000	86	87	193	6.89	344.96	0
BRYBND	1000	19	20	50	2.85	3.0333e-11	0
BRYBND	5000	26	27	83	20.03	2.1092e-13	0
CRAGGLVY	1000	14	15	25	1.50	336.42	0
CRAGGLVY	5000	14	15	26	7.32	1688.2	0
DIXMAANA	1500	5	6	15	0.92	1	0
DIXMAANA	3000	5	6	15	1.85	1	0
DIXMAANB	1500	7	8	14	1.06	1	0
DIXMAANB	3000	7	8	14	2.12	1	0
DIXMAANC	1500	24	25	41	2.39	1	0
DIXMAANC	3000	26	27	46	5.32	1	0
DIXMAAND	1500	22	23	38	2.38	1	0
DIXMAAND	3000	33	34	59	6.31	1	0
DIXMAANE	1500	6	7	17	1.01	1	0
DIXMAANE	3000	6	7	17	2.02	1	0
DIXMAANF	1500	30	31	55	3.06	1	0
DIXMAANF	3000	32	33	58	6.44	1	0
DIXMAANG	1500	46	47	84	4.23	1	0
DIXMAANG	3000	43	44	80	8.11	1	0
DIXMAANH	1500	52	53	109	4.78	1	0
DIXMAANH	3000	48	49	90	8.91	1	0
DIXMAANI	1500	9	10	30	1.32	1	0
DIXMAANI	3000	9	10	44	3.01	1	0
DIXMAANJ	1500	58	59	118	5.30	1	0
DIXMAANJ	3000	111	112	222	18.78	1	0
DIXMAANK	1500	40	41	86	3.86	1	0
DIXMAANK	3000	54	55	113	10.03	1	0
DIXMAANL	1500	83	84	163	7.16	1	0
DIXMAANL	3000	55	56	112	10.00	1	0
DQDRTIC	1000	2	3	2	0.38	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.79	1.6602e-23	0
DQRTIC	1000	35	36	62	2.38	3.6952e-06	0
DQRTIC	5000	42	43	73	12.81	7.0042e-06	0
EDENSCH	2000	12	13	21	2.39	12003	0
EIGENALS	930	45	46	165	82.83	5.9387e-11	0
EIGENBLS	930	557	558	17901	3057.76	2.2839e-06	0
ENGVAL1	1000	7	8	14	0.80	1108.2	0
ENGVAL1	5000	7	8	14	3.81	5548.7	0
FLETCBV2	1000	0	1	0	0.32	-0.50134	0

Table 53: DXZ with band preconditioning on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	19994	706.95	-7.3373e+10	1
FMINSURF	1024	582	583	1281	190.45	1	0
FMINSURF	5625	2056	2057	4391	15831.28	1	0
FREUROTH	1000	8	9	15	0.94	121470	0
FREUROTH	5000	8	9	15	4.51	608160	0
LIARWHD	1000	14	15	35	1.25	2.0274e-20	0
LIARWHD	5000	13	14	28	5.54	6.0958e-16	0
MOREBV	1000	1	2	2	0.37	7.3289e-13	0
MOREBV	5000	1	2	2	1.76	5.8478e-15	0
MSQRTALS	1024	193	194	11463	1805.63	1.3971e-08	0
MSQRTALS	529	153	154	10412	474.05	1.5852e-08	0
MSQRTBLS	529	75	76	5890	263.99	1.8887e-08	0
MSQRTBLS	1024	52	53	2554	430.84	1.2473e-08	0
NCB20B	1000	18	19	599	49.16	1676	0
NONDIA	1000	16	17	37	1.31	2.4396e-16	0
NONDIA	5000	17	18	40	6.43	3.8721e-16	0
NONDIA	10000	16	17	37	12.40	5.544e-16	0
NONDQUAR	1000	17	18	36	1.21	1.3932e-09	0
NONDQUAR	5000	18	19	37	5.74	1.0076e-09	0
NONDQUAR	10000	19	20	38	12.05	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	45	46	285	17.29	0.0096862	0
POWELLSG	1000	15	16	30	1.06	2.2324e-06	0
POWELLSG	5000	15	16	32	4.74	5.2976e-06	0
POWELLSG	10000	15	16	32	9.74	1.0595e-05	0
POWER	1000	27	28	80	7.50	1.8888e-08	0
QUARTC	1000	35	36	62	2.38	3.6952e-06	0
QUARTC	5000	42	43	73	13.03	7.0042e-06	0
QUARTC	10000	45	46	78	27.19	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.70	-2994	0
SCHMVETT	5000	3	4	6	3.39	-14994	0
SCHMVETT	10000	3	4	6	6.74	-29994	0
SINQUAD	1000	93	94	332	10.42	3.0767e-08	0
SINQUAD	5000	198	199	688	155.73	2.0335e-07	0
SINQUAD	10000	191	192	599	318.49	2.4328e-05	0
SPMSRTLS	1000	43	44	88	5.04	1.0143e-11	0
SPMSRTLS	4999	64	65	135	36.14	2.013e-11	0
SPMSRTLS	10000	526	527	24322	4010.24	2.679	0
SROSENBR	1000	10	11	20	0.81	5.8309e-13	0
SROSENBR	5000	10	11	20	3.71	2.9154e-12	0
SROSENBR	10000	10	11	20	7.48	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.56	7.6524e-11	0

Table 54: DXZ with band preconditioning on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.42	10	0
TOINTGSS	5000	2	3	4	1.99	10	0
TOINTGSS	10000	2	3	4	4.02	10	0
TQUARTIC	1000	16	17	45	1.39	2.7256e-09	0
TQUARTIC	5000	17	18	41	8.87	2.4179e-09	0
TQUARTIC	10000	18	19	48	23.46	5.7595e-12	0
TRIDIA	1000	2	3	3	0.48	1.3827e-32	0
TRIDIA	5000	2	3	3	2.18	4.1976e-33	0
TRIDIA	10000	2	3	3	4.35	5.3451e-33	0
VARDIM	1000	36	37	36	18.75	1.1203e-20	0
VARDIM	5000	45	46	45	551.05	1.1459e-18	3
VAREIGVL	1000	12	13	70	4.44	5.6139e-08	0
VAREIGVL	5000	13	14	59	83.52	7.7013e-08	0
WOODS	1000	16	17	31	1.22	1.9658e-14	0
WOODS	10000	16	17	31	11.84	1.9658e-13	0
FLETCHCR	1000	1319	1320	2638	78.72	5.0637e-19	0
GENROSE	1000	1019	1020	2087	56.29	1	0

Table 55: DXZ with band preconditioning on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	112	113	6214	34.44	0	0
CATENARY	501	743	744	18016	89.29	-348400	0
CHANDHEQ	100	13	14	62	6.76	6.7959e-08	0
CHEMRCTA	100	27	28	436	0.94	6.0657e-16	0
CHEMRCTB	1000	32	33	92	3.89	1.3194e-07	0
CLPLATEC	5041	3	4	3935	201.56	-0.0050207	0
CORKSCRW	456	132	133	72166	206.73	26.484	0
DALLASM	196	82	83	15783	25.35	-48198	0
DISCS	36	10000	10001	1863940	2022.09	17.247	1
DRUGDIS	304	238	239	5264	25.13	4.2511	0
DTOC5	9999	25	26	91	44.87	1.5316	0
EXPFITB	5	62	63	902	2.49	0.0050193	0
EXPFITC	5	84	85	1696	13.61	0.023303	0
FCCU	19	16	17	58	0.33	11.149	0
FLETCHER	4	34	35	68	0.53	19.525	0
GILBERT	500	29	30	71	3.39	237.37	0
GRIDNETA	3444	35	36	3753	89.24	161.61	0
GRIDNETE	3444	27	28	2939	104.23	144.06	0
HADAMARD	257	369	370	38385	456.48	1.1399	0
HAGER3	2001	12	13	32	4.02	0.14096	0
HAGER4	2001	11	12	2294	47.04	2.7942	0
HS114	10	893	894	5489	13.20	-1768.8	0
HS59	2	343	344	712	4.73	-7.8028	0
HS75	4	133	134	528	1.96	5174.4	0
HVYCRASH	204	274	275	4976	17.01	-0.2185	0
HYDROELL	1009	143	144	22557	253.59	-3.5855e+06	0
JUNKTURN	5010	164	165	1771	157.24	9.4948e-06	0
KSIP	20	69	70	3794	66.19	0.57579	0
LINVERSE	1999	24	25	1324	59.31	681	0
LMINSURF	1024	1622	1623	3679	143.05	9	0
MANNE	300	6	7	75	0.94	-0.97457	0
MEYER3	3	421	422	1158	5.86	87.946	0
MINPERM	51	18	19	141	0.49	0.0384	0
MISTAKE	9	24	25	193	0.47	-1	0
NGONE	50	3218	3219	76753	391.24	-0.64103	0
NLMSURF	1024	5018	5019	10703	432.80	38.591	0
NYSTROM5	18	172	173	1513	3.19	0.0014026	8
ODC	10404	19	20	916	143.35	-0.0040122	0
OET1	3	38	39	974	13.36	0.53824	0
OPTCTRL3	122	61	62	249	1.68	2048	0
ORTHREGA	2053	171	172	930	59.46	5661.4	0
ORTHREGC	5005	50	51	379	60.11	94.813	0

Table 56: DXZ with band preconditioning on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	556	557	2666	13.93	15.59	0
ORTHREGF	1205	160	161	397	19.28	16.255	0
PRODPL1	60	51	52	1185	1.47	35.739	0
QR3D	610	189	190	19713	565.17	2.4755e-09	0
QR3DBD	457	102	103	1960	50.58	4.9541e-09	0
READING1	202	784	785	19949	60.70	-0.16049	0
SEMICON1	102	—	—	—	—	—	6
SEMICON2	1002	133	134	259	28.57	1.6676e-06	0
SIPOW1	2	40	41	1239	31.67	-1	0
SPANHYD	97	37	38	1305	1.72	239.74	0
SSC	10404	1	2	93	28.22	-2.0782	0
SSEBNLN	194	66	67	1454	3.27	1.6171e+07	0
SSNLBEAM	3003	236	237	7062	267.88	340.03	0
STEENBRE	540	8052	8053	188860	452.81	27460	0
TENBARS1	18	425	426	5192	7.51	2295.4	0
TENBARS2	18	183	184	1621	3.13	2277.9	0
TRAINF	408	43	44	1275	5.35	3.0975	0
TRUSPYR1	11	704	705	3208	10.95	11.229	0
UBH5	1010	60	61	16443	104.35	1.1163	0
WATER	31	37	38	343	0.71	10549	0
ZIGZAG	304	89	90	17835	43.77	33.787	0

Table 57: DXZ with band preconditioning on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	14	0.15	5.7444	0
ARWHEAD	100	5	6	7	0.16	0	0
ARWHEAD	500	5	6	6	0.59	1.3224e-09	0
BARD	3	8	9	15	0.15	1.8863	0
BDQRTIC	100	11	12	20	0.38	378.77	0
BDQRTIC	500	11	12	20	2.44	1981	0
BEALE	2	7	8	14	0.12	2.9425e-14	0
BIGGS6	6	66	67	155	0.98	1.2399e-08	0
BOX3	3	7	8	14	0.13	6.075e-12	0
BRKMCC	2	3	4	5	0.06	0.16904	0
BROWNAL	10	4	5	7	0.09	1.1263e-10	0
BROWNBS	2	35	36	56	0.51	1.3553e-20	0
BROWNDEN	4	11	12	20	0.20	85822	0
BROYDN7D	10	19	20	39	0.30	1.2611	0
BROYDN7D	100	24	25	46	0.61	29.492	0
BROYDN7D	500	36	37	72	2.54	151.95	0
BRYBND	10	12	13	23	0.21	1.9159e-16	0
BRYBND	100	12	13	25	0.42	1.2809e-17	0
BRYBND	500	15	16	29	1.78	1.4374e-26	0
CHNROSNB	10	20	21	40	0.31	2.7163e-17	0
CLIFF	2	27	28	30	0.38	0.19979	0
CRAGGLVY	100	14	15	25	0.36	32.27	0
CRAGGLVY	4	16	17	30	0.25	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.93	167.45	0
CUBE	2	19	20	35	0.28	1.8745e-14	0
DENSCHNA	2	5	6	9	0.10	1.2e-15	0
DENSCHNB	2	3	4	5	0.07	0	0
DENSCHNC	2	9	10	13	0.15	1.8423e-13	0
DENSCHND	3	42	43	79	0.60	1.4687e-08	0
DENSCHNE	3	10	11	15	0.16	1.9841e-12	0
DENSCHNF	2	6	7	12	0.11	6.5139e-22	0
DIXMAANA	15	4	5	7	0.07	1	0
DIXMAANA	90	4	5	8	0.11	1	0
DIXMAANA	300	4	5	8	0.21	1	0
DIXMAANB	15	12	13	21	0.14	1	0
DIXMAANB	90	6	7	11	0.15	1	0
DIXMAANB	300	6	7	12	0.29	1	0
DIXMAANC	15	9	10	16	0.12	1	0
DIXMAANC	90	11	12	19	0.22	1	0
DIXMAANC	300	9	10	16	0.41	1	0
DIXMAAND	15	9	10	17	0.11	1	0
DIXMAAND	90	11	12	20	0.22	1	0

Table 58: DXZ with full factorization preconditioning on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	12	13	22	0.49	1	0
DIXMAANE	15	5	6	10	0.08	1	0
DIXMAANE	90	5	6	10	0.11	1	0
DIXMAANE	300	6	7	12	0.24	1	0
DIXMAANF	15	10	11	19	0.12	1	0
DIXMAANF	90	11	12	21	0.22	1	0
DIXMAANF	300	33	34	61	1.09	1	0
DIXMAANG	15	16	17	31	0.19	1	0
DIXMAANG	90	12	13	22	0.24	1	0
DIXMAANG	300	22	23	43	0.79	1	0
DIXMAANH	15	20	21	37	0.22	1	0
DIXMAANH	90	12	13	21	0.24	1	0
DIXMAANH	300	43	44	83	1.41	1	0
DIXMAANI	15	5	6	10	0.07	1	0
DIXMAANI	90	5	6	10	0.12	1	0
DIXMAANI	300	5	6	10	0.23	1	0
DIXMAANJ	15	14	15	29	0.16	1	0
DIXMAANJ	90	16	17	31	0.30	1	0
DIXMAANJ	300	56	57	110	1.78	1	0
DIXMAANK	15	16	17	30	0.18	1	0
DIXMAANK	90	70	71	137	1.12	1	0
DIXMAANK	300	42	43	81	1.36	1	0
DIXMAANL	15	12	13	24	0.14	1	0
DIXMAANL	90	30	31	61	0.51	1	0
DIXMAANL	300	39	40	77	1.28	1	0
DIXON3DQ	10	2	3	4	0.05	2.4652e-32	0
DJTL	2	126	127	175	1.70	-8951.5	0
DQDRTIC	10	2	3	2	0.06	1.6602e-23	0
DQDRTIC	100	2	3	2	0.08	1.6602e-23	0
DQDRTIC	500	2	3	2	0.22	1.6602e-23	0
DQRTIC	100	26	27	47	0.52	4.5801e-07	0
DQRTIC	500	33	34	59	1.36	5.8379e-07	0
EDENSCH	36	14	15	22	0.27	219.28	0
EIGENALS	110	33	34	65	1.53	9.7155e-12	0
EIGENALS	420	38	39	72	15.62	10	0
EIGENBLS	110	112	113	240	23.90	6.2695e-13	0
EIGENBLS	420	364	365	792	3027.91	9.9773e-09	0
EIGENCLS	462	242	243	588	2690.09	2.7144e-11	0
ENGVAL1	100	7	8	14	0.19	109.09	0
ENGVAL1	2	7	8	12	0.11	0	0
ERRINROS	10	30	31	53	0.45	7.195	0
ERRINROS	50	58	59	97	1.02	39.904	0

Table 59: DXZ with full factorization preconditioning on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.20	0.24051	0
EXTROSNB	5	27	28	53	0.41	1.6025e-09	0
FLETCBV2	100	1	2	2	0.07	-0.51401	0
FLETCBV3	100	10000	10001	17879	205.38	-163140	1
FLETCHBV	10	124	125	239	1.58	-2.6113e+06	0
FLETCHBV	100	10000	10001	17732	205.11	-1.6254e+13	1
FLETCHCR	10	24	25	48	0.36	1.1979e-19	0
FLETCHCR	100	142	143	284	2.88	7.3832e-19	0
FMINSURF	121	185	186	370	21.11	1	0
FMINSURF	16	74	75	141	1.10	1	0
FREUROTH	100	7	8	13	0.20	11965	0
FREUROTH	2	9	10	14	0.15	48.984	0
FREUROTH	50	7	8	13	0.16	5881	0
FREUROTH	500	7	8	13	0.53	60634	0
GENROSE	10	25	26	49	0.39	1	0
GENROSE	100	104	105	210	2.09	1	0
GENROSE	500	569	570	1088	25.14	1	0
GROWTHLS	3	127	128	226	1.80	1.004	0
GULF	3	—	—	—	—	—	6
HAIRY	2	724	725	1190	5.46	20	0
HATFLDD	3	13	14	25	0.21	6.6158e-08	0
HATFLDE	3	18	19	33	0.29	5.1204e-07	0
HEART6LS	6	10000	10001	19367	135.66	0.36255	1
HELIX	3	12	13	24	0.18	1.4115e-17	0
HILBERTA	2	2	3	2	0.04	6.656e-31	0
HILBERTB	5	2	3	2	0.03	1.5953e-29	0
HIMMELBB	2	37	38	58	0.51	2.9382e-20	0
HIMMELBF	4	10000	10001	20000	130.59	323.4	1
HIMMELBG	2	8	9	11	0.09	5.1108e-17	0
HIMMELBH	2	1	2	1	0.02	-1	0
HYDC20LS	99	10000	10001	113053	596.12	1.853	1
JENSMP	2	9	10	14	0.15	124.36	0
KOWOSB	4	15	16	30	0.22	0.0003078	0
LIARWHD	100	10	11	19	0.26	1.2325e-15	0
LIARWHD	36	10	11	18	0.20	4.3062e-17	0
LIARWHD	500	14	15	21	0.97	2.4691e-12	0
LOGROS	2	172	173	204	2.07	0	0
MANCINO	100	12	13	19	28.51	4.5339e-21	0
MOREBV	10	2	3	4	0.05	6.582e-14	0
MOREBV	100	1	2	2	0.07	7.887e-10	0
MOREBV	500	1	2	2	0.23	5.9316e-12	0
MSQRTALS	100	260	261	522	41.85	1.255e-17	0

Table 60: DXZ with full factorization preconditioning on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.24	6.2623e-12	0
MSQRTALS	49	38	39	73	1.45	1.1202e-13	0
MSQRTBLS	100	146	147	292	22.85	3.3925e-17	0
MSQRTBLS	49	40	41	81	1.53	9.7565e-14	0
MSQRTBLS	9	20	21	36	0.31	2.6052e-14	0
NCB20B	100	26	27	83	2.72	196.68	0
NCB20B	50	16	17	52	0.76	99.504	0
NCB20B	500	33	34	98	19.58	897.52	0
NONDIA	100	13	14	20	0.31	2.3792e-19	0
NONDIA	50	12	13	18	0.24	3.8512e-16	0
NONDIA	500	15	16	22	1.08	7.4396e-15	0
NONDQUAR	100	15	16	27	0.37	2.3999e-09	0
NONDQUAR	500	16	17	27	1.91	2.2043e-09	0
NONMSQRT	100	900	901	5113	43.57	18.061	3
NONMSQRT	49	924	925	15927	34.44	1.0755	0
NONMSQRT	9	228	229	559	3.24	0.75199	0
OSBORNEA	5	29	30	50	0.48	5.4649e-05	0
OSBORNEB	11	17	18	33	0.48	0.040138	0
PALMER1C	8	10	11	17	0.18	0.097605	0
PALMER1D	7	8	9	15	0.15	0.65267	0
PALMER2C	8	7	8	13	0.13	0.014369	0
PALMER3C	8	7	8	13	0.13	0.019538	0
PALMER4C	8	7	8	13	0.13	0.050311	0
PENALTY1	10	21	22	28	0.34	7.0958e-05	0
PENALTY1	100	33	34	44	2.53	0.00090253	0
PENALTY1	50	31	32	43	0.87	0.00043183	0
PENALTY1	500	39	40	49	197.93	0.0047791	0
PENALTY2	10	24	25	46	0.39	0.00029372	0
PENALTY2	100	19	20	38	1.75	97096	0
PENALTY2	50	23	24	39	0.71	4.2961	0
PENALTY3	100	26	27	43	33.29	0.00099997	0
PENALTY3	50	15	16	23	3.58	0.001	0
PFIT1LS	3	77	78	139	1.08	4.9859e-08	0
POWELLSG	100	15	16	30	0.34	1.0595e-07	0
POWELLSG	500	15	16	30	0.71	5.2976e-07	0
POWELLSG	20	15	16	30	0.25	2.119e-08	0
POWELLSG	4	15	16	30	0.22	4.2381e-09	0
POWER	10	16	17	31	0.25	1.8532e-08	0
POWER	100	22	23	44	1.91	8.1386e-09	0
POWER	50	20	21	40	0.58	1.3296e-08	0
POWER	500	26	27	52	160.15	7.6219e-09	0
QUARTC	100	26	27	47	0.52	4.5801e-07	0

Table 61: DXZ with full factorization preconditioning on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.33	5.2022e-08	0
QUARTC	500	33	34	59	1.36	5.8379e-07	0
ROSENBR	2	26	27	48	0.37	5.3155e-15	0
S308	2	9	10	15	0.15	0.7732	0
SCHMVETT	10	3	4	6	0.06	-24	0
SCHMVETT	500	3	4	6	0.41	-1494	0
SCHMVETT	3	3	4	6	0.05	-3	0
SCHMVETT	500	3	4	6	0.41	-1494	0
SINQUAD	100	11	12	22	0.33	1.1721e-08	0
SINQUAD	5	11	12	22	0.18	1.1721e-08	0
SINQUAD	50	11	12	22	0.25	1.1721e-08	0
SINQUAD	500	11	12	22	1.59	1.1721e-08	0
SISSER	2	12	13	19	0.19	1.1139e-08	0
SNAIL	2	88	89	162	0.82	3.3439e-14	0
SPMSRTLS	100	23	24	48	0.63	4.7434e-14	0
SPMSRTLS	28	38	39	77	0.66	1.5023e-13	0
SPMSRTLS	499	63	64	138	4.77	1.6472e-16	0
SROSENBR	10	6	7	10	0.11	4.6748e-17	0
SROSENBR	100	6	7	10	0.16	4.6748e-16	0
SROSENBR	50	6	7	10	0.13	2.3374e-16	0
SROSENBR	500	10	11	20	0.52	2.9154e-13	0
TOINTGOR	50	8	9	15	0.18	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.08	10	0
TOINTGSS	50	2	3	4	0.06	10	0
TOINTGSS	500	2	3	4	0.25	10	0
TOINTPSP	50	77	78	140	1.30	225.56	0
TOINTQOR	50	4	5	8	0.10	1175.5	0
TQUARTIC	100	1	2	2	0.07	3.2698e-28	0
TQUARTIC	5	1	2	2	0.04	6.4095e-31	0
TQUARTIC	50	1	2	2	0.06	2.5638e-30	0
TQUARTIC	500	1	2	2	0.25	1.5772e-27	0
TRIDIA	10	1	2	2	0.04	1.4421e-30	0
TRIDIA	100	2	3	3	0.09	4.1648e-32	0
TRIDIA	50	2	3	3	0.07	4.1648e-32	0
TRIDIA	500	2	3	3	0.28	4.0445e-33	0
VARDIM	10	14	15	14	0.24	1.595e-26	0
VARDIM	100	25	26	25	2.68	5.171e-26	0
VARDIM	50	22	23	22	0.69	1.2641e-27	0
VARDIM	500	33	34	33	301.03	1.1634e-25	0
VAREIGVL	10	22	23	51	0.33	8.4206e-10	0
VAREIGVL	100	12	13	24	1.11	3.0802e-09	0

Table 62: DXZ with full factorization preconditioning on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	26	0.42	1.227e-10	0
VAREIGVL	500	12	13	23	74.35	1.8652e-08	0
VIBRBEAM	8	89	90	171	1.83	10.423	0
WATSON	12	130	131	275	2.96	5.666e-07	0
WATSON	31	11	12	24	0.61	1.538e-09	0
WOODS	100	15	16	28	0.34	2.0135e-17	0
WOODS	4	15	16	28	0.23	8.0539e-19	0
WOODS	500	16	17	31	0.81	9.8289e-15	0
YFITU	3	51	52	99	0.75	6.6697e-13	0
ZANGWIL2	2	1	2	1	0.02	-18.2	0
PFIT2LS	3	477	478	827	6.54	2.3465e-09	0
PFIT3LS	3	283	284	486	3.80	2.4568e-18	0
PFIT4LS	3	326	327	528	4.39	1.1595e-16	0
EXTROSNB	10	596	597	1191	8.21	1.1609e-10	0
EXTROSNB	50	1011	1012	2020	15.70	1.4875e-07	0
EXTROSNB	100	287	288	572	5.08	1.3092e-06	0

Table 63: DXZ with full factorization preconditioning on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	1.57	1.6903e-10	0
ARWHEAD	5000	5	6	6	26.75	1.11e-12	0
BDQRTIC	1000	11	12	20	8.24	3983.8	0
BROYDN7D	1000	25	26	46	3.33	298.54	0
BRYBND	1000	15	16	30	3.40	6.0033e-26	0
BRYBND	5000	12	13	23	14.34	8.532e-15	0
CRAGGLVY	1000	14	15	25	1.71	336.42	0
CRAGGLVY	5000	14	15	26	8.61	1688.2	0
DIXMAANA	1500	4	5	8	0.81	1	0
DIXMAANA	3000	4	5	8	1.59	1	0
DIXMAANB	1500	6	7	12	1.24	1	0
DIXMAANB	3000	6	7	12	2.47	1	0
DIXMAANC	1500	9	10	17	1.79	1	0
DIXMAANC	3000	9	10	17	3.58	1	0
DIXMAAND	1500	18	19	34	2.77	1	0
DIXMAAND	3000	19	20	34	5.42	1	0
DIXMAANE	1500	6	7	12	1.00	1	0
DIXMAANE	3000	6	7	12	1.97	1	0
DIXMAANF	1500	28	29	49	3.79	1	0
DIXMAANF	3000	55	56	103	14.19	1	0
DIXMAANG	1500	28	29	52	3.89	1	0
DIXMAANG	3000	87	88	173	21.47	1	0
DIXMAANH	1500	57	58	108	7.15	1	0
DIXMAANH	3000	73	74	139	18.56	1	0
DIXMAANI	1500	5	6	10	0.91	1	0
DIXMAANI	3000	6	7	12	1.97	1	0
DIXMAANJ	1500	41	42	79	5.38	1	0
DIXMAANJ	3000	69	70	135	17.39	1	0
DIXMAANK	1500	98	99	194	12.46	1	0
DIXMAANK	3000	37	38	78	10.11	1	0
DIXMAANL	1500	69	70	133	8.79	1	0
DIXMAANL	3000	75	76	148	19.34	1	0
DQDRTIC	1000	2	3	2	0.39	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.84	1.6602e-23	0
DQRTIC	1000	35	36	62	2.47	3.6952e-06	0
DQRTIC	5000	42	43	73	13.27	7.0042e-06	0
EDENSCH	2000	14	15	22	3.03	12003	0
EIGENALS	930	53	54	91	96.44	3.5938e-17	0
EIGENBLS	930	—	—	—	—	—	6
ENGVAL1	1000	7	8	14	0.90	1108.2	0
ENGVAL1	5000	7	8	14	4.34	5548.7	0
FLETCBV2	1000	0	1	0	0.31	-0.50134	0

Table 64: DXZ with full factorization preconditioning on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	19993	836.57	-5.7039e+10	1
FMINSURF	1024	301	302	602	14544.00	1	0
FMINSURF	5625	1	2	1	33.37	28.594	5
FREUROTH	1000	7	8	13	0.95	121470	0
FREUROTH	5000	7	8	13	4.66	608160	0
LIARWHD	1000	13	14	20	2.13	2.9481e-18	0
LIARWHD	5000	13	14	18	29.11	6.0958e-16	0
MOREBV	1000	1	2	2	0.41	7.3289e-13	0
MOREBV	5000	1	2	2	1.94	5.8271e-15	0
MSQRTALS	1024	—	—	—	—	—	6
MSQRTALS	529	508	509	1032	9247.95	1.3239e-12	0
MSQRTBLS	529	291	292	585	5255.58	6.9286e-12	0
MSQRTBLS	1024	—	—	—	—	—	6
NCB20B	1000	25	26	67	28.29	1676	0
NONDIA	1000	15	16	23	2.49	3.5326e-14	0
NONDIA	5000	14	15	21	33.89	6.15e-08	0
NONDIA	10000	14	15	21	121.61	6.3481e-08	0
NONDQUAR	1000	17	18	29	6.17	9.7143e-10	0
NONDQUAR	5000	18	19	29	135.84	1.0132e-09	0
NONDQUAR	10000	19	20	30	612.51	3.8883e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	45	46	58	1880.40	0.0096862	0
POWELLSG	1000	15	16	30	1.20	1.0595e-06	0
POWELLSG	5000	15	16	30	5.46	5.2976e-06	0
POWELLSG	10000	15	16	30	11.22	1.0595e-05	0
POWER	1000	28	29	56	1430.61	4.7488e-09	0
QUARTC	1000	35	36	62	2.41	3.6952e-06	0
QUARTC	5000	42	43	73	13.22	7.0042e-06	0
QUARTC	10000	45	46	78	27.86	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.78	-2994	0
SCHMVETT	5000	3	4	6	3.81	-14994	0
SCHMVETT	10000	3	4	6	7.57	-29994	0
SINQUAD	1000	11	12	22	4.81	1.1721e-08	0
SINQUAD	5000	13	14	26	109.46	3.5185e-10	0
SINQUAD	10000	24	25	46	811.30	1.649e-10	0
SPMSRTLS	1000	83	84	162	11.48	8.743e-14	0
SPMSRTLS	4999	98	99	206	68.30	0.36641	0
SPMSRTLS	10000	46	47	101	70.25	0.037234	0
SROSENBR	1000	10	11	20	0.86	5.8309e-13	0
SROSENBR	5000	10	11	20	3.96	2.9154e-12	0
SROSENBR	10000	10	11	20	7.96	5.8309e-12	0
TESTQUAD	1000	2	3	3	0.44	2.3752e-30	0

Table 65: DXZ with full factorization preconditioning on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.45	10	0
TOINTGSS	5000	2	3	4	2.12	10	0
TOINTGSS	10000	2	3	4	4.26	10	0
TQUARTIC	1000	1	2	2	0.53	1.7736e-27	0
TQUARTIC	5000	1	2	2	6.01	1.9964e-26	0
TQUARTIC	10000	1	2	2	27.70	1.6149e-25	0
TRIDIA	1000	2	3	3	0.50	1.1556e-33	0
TRIDIA	5000	2	3	3	2.25	4.1889e-33	0
TRIDIA	10000	2	3	3	4.55	1.5407e-32	0
VARDIM	1000	36	37	36	2594.43	1.1203e-20	0
VARDIM	5000	1	2	1	122.84	4.8283e+27	5
VAREIGVL	1000	12	13	24	604.92	5.6909e-08	0
VAREIGVL	5000	1	2	1	38.11	236900	5
WOODS	1000	16	17	31	1.37	1.9658e-14	0
WOODS	10000	16	17	31	13.51	1.9658e-13	0
FLETCHCR	1000	1319	1320	2638	100.29	2.3517e-18	0
GENROSE	1000	2167	2168	4329	160.84	1	0

Table 66: DXZ with full factorization preconditioning on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	206	207	5571	51.85	0	0
CATENARY	501	400	401	15321	72.45	-348400	0
CHANDHEQ	100	13	14	26	34.69	1.5489e-08	0
CHEMRCTA	100	7460	7461	13982	188.84	0.0060578	8
CHEMRCTB	1000	96	97	200	13.02	2.4679e-21	0
CLPLATEC	5041	1	2	2	2.56	-0.0050207	0
CORKSCRW	456	76	77	4223	22.11	26.484	0
DALLASM	196	42	43	85	1.79	-48198	0
DISCS	36	535	536	1907	15.45	21.376	0
DRUGDIS	304	243	244	8754	43.77	4.2427	0
DTOC5	9999	21	22	42	44.58	1.5316	0
EXPFITB	5	29	30	80	1.07	0.0050194	0
EXPFITC	5	43	44	222	6.26	0.023302	0
FCCU	19	10	11	20	0.23	11.149	0
FLETCHER	4	36	37	70	0.55	19.525	0
GILBERT	500	27	28	38	154.61	237.37	0
GRIDNETA	3444	18	19	43	10.23	161.61	0
GRIDNETE	3444	11	12	22	15.38	144.06	0
HADAMARD	257	675	676	4609	901.37	1	0
HAGER3	2001	4	5	8	3.34	0.14096	0
HAGER4	2001	8	9	1014	24.04	2.7942	0
HS114	10	420	421	908	5.81	-1768.8	0
HS59	2	335	336	572	4.82	-7.8028	0
HS75	4	107	108	244	1.55	5174.4	0
HVYCRASH	204	1245	1246	5636	45.88	-0.2185	0
HYDROELL	1009	140	141	6996	81.12	-3.5855e+06	0
JUNKTURN	5010	159	160	4576	392.98	9.6648e-06	0
KSIP	20	28	29	247	29.90	0.57579	0
LINVERSE	1999	130	131	2874	141.54	681	0
LMINSURF	1024	192	193	384	38.49	9	0
MANNE	300	8	9	128	1.34	-0.97457	0
MEYER3	3	263	264	689	3.81	87.946	0
MINPERM	51	31	32	82	0.94	0.0384	0
MISTAKE	9	37	38	102	0.64	-1	0
NGONE	50	686	687	2247	61.27	-0.64102	0
NLMSURF	1024	223	224	446	44.07	38.591	0
NYSTROM5	18	69	70	173	1.17	2.2527e-05	0
ODC	10404	19	20	38	55.79	-0.0040122	0
OET1	3	28	29	322	10.27	0.53824	0
OPTCTRL3	122	46	47	91	1.44	2048	0
ORTHREGA	2053	98	99	204	72.26	5661.4	0
ORTHREGC	5005	51	52	127	168.35	94.815	0

Table 67: DXZ with full factorization preconditioning on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	43	44	103	1.34	15.59	0
ORTHREGF	1205	59	60	160	16.23	16.324	0
PRODPL1	60	55	56	590	1.36	35.739	0
QR3D	610	2235	2236	4888	16995.28	3.6256e-13	0
QR3DBD	457	92	93	176	355.23	6.1981e-13	0
READING1	202	1347	1348	27267	79.79	-0.16049	0
SEMICON1	102	—	—	—	—	—	6
SEMICON2	1002	133	134	259	32.03	1.6676e-06	0
SIPOW1	2	28	29	375	27.58	-1	0
SPANHYD	97	64	65	1521	2.69	239.74	0
SSC	10404	1	2	2	7.15	-2.0782	0
SSEBNLN	194	70	71	1340	3.34	1.6171e+07	0
SSNLBEAM	3003	500	501	24657	1032.27	340.02	0
STEENBRE	540	143	144	3238	14.20	28396	0
TENBARS1	18	778	779	1942	12.14	2295.4	0
TENBARS2	18	1331	1332	3555	21.00	2277.9	0
TRAINF	408	47	48	1154	5.67	3.0975	0
TRUSPYR1	11	1345	1346	4249	21.09	11.229	0
UBH5	1010	24	25	45	5.14	1.1163	0
WATER	31	29	30	137	0.57	10549	0
ZIGZAG	304	75	76	2501	9.26	33.787	0

Table 68: DXZ with full factorization preconditioning on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.15	5.7444	0
ARWHEAD	100	5	6	7	0.15	0	0
ARWHEAD	500	5	6	6	0.37	1.3237e-09	0
BARD	3	7	8	13	0.13	0.0082149	0
BDQRTIC	100	11	12	23	0.30	378.77	0
BDQRTIC	500	11	12	24	0.82	1981	0
BEALE	2	7	8	14	0.12	2.9425e-14	0
BIGGS6	6	61	62	126	0.90	3.8591e-12	0
BOX3	3	7	8	13	0.12	1.9221e-11	0
BRKMCC	2	3	4	5	0.06	0.16904	0
BROWNAL	10	5	6	42	0.11	9.2726e-11	0
BROWNBS	2	34	35	50	0.52	0	0
BROWNDEN	4	11	12	20	0.20	85822	0
BROYDN7D	10	16	17	32	0.26	1.2611	0
BROYDN7D	100	30	31	65	0.65	29.362	0
BROYDN7D	500	54	55	122	2.55	169.56	0
BRYBND	10	11	12	36	0.18	7.2241e-15	0
BRYBND	100	12	13	38	0.37	1.3572e-12	0
BRYBND	500	15	16	43	1.27	1.7435e-13	0
CHNROSNB	10	25	26	50	0.38	4.308e-21	0
CLIFF	2	27	28	30	0.39	0.19979	0
CRAGGLVY	100	14	15	25	0.34	32.27	0
CRAGGLVY	4	16	17	30	0.25	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.84	167.45	0
CUBE	2	36	37	66	0.51	5.0982e-12	0
DENSCHNA	2	5	6	9	0.09	1.2e-15	0
DENSCHNB	2	3	4	5	0.06	0	0
DENSCHNC	2	9	10	13	0.14	1.8423e-13	0
DENSCHND	3	33	34	63	0.49	8.6576e-09	0
DENSCHNE	3	11	12	16	0.17	2.4642e-12	0
DENSCHNF	2	6	7	12	0.10	6.5139e-22	0
DIXMAANA	15	5	6	9	0.08	1	0
DIXMAANA	90	5	6	14	0.11	1	0
DIXMAANA	300	5	6	14	0.23	1	0
DIXMAANB	15	6	7	11	0.08	1	0
DIXMAANB	90	8	9	18	0.16	1	0
DIXMAANB	300	7	8	13	0.28	1	0
DIXMAANC	15	9	10	15	0.12	1	0
DIXMAANC	90	9	10	16	0.17	1	0
DIXMAANC	300	11	12	20	0.38	1	0
DIXMAAND	15	9	10	16	0.11	1	0
DIXMAAND	90	10	11	21	0.19	1	0

Table 69: NMTR1 with band preconditioning and $p = 5$ on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.39	1	0
DIXMAANE	15	6	7	12	0.08	1	0
DIXMAANE	90	6	7	16	0.13	1	0
DIXMAANE	300	6	7	16	0.27	1	0
DIXMAANF	15	10	11	20	0.11	1	0
DIXMAANF	90	10	11	21	0.18	1	0
DIXMAANF	300	32	33	67	0.89	1	0
DIXMAANG	15	11	12	22	0.13	1	0
DIXMAANG	90	16	17	33	0.27	1	0
DIXMAANG	300	24	25	47	0.72	1	0
DIXMAANH	15	13	14	26	0.13	1	0
DIXMAANH	90	19	20	40	0.31	1	0
DIXMAANH	300	26	27	49	0.74	1	0
DIXMAANI	15	5	6	11	0.07	1	0
DIXMAANI	90	6	7	15	0.12	1	0
DIXMAANI	300	6	7	15	0.25	1	0
DIXMAANJ	15	12	13	24	0.13	1	0
DIXMAANJ	90	20	21	42	0.30	1	0
DIXMAANJ	300	21	22	43	0.66	1	0
DIXMAANK	15	16	17	32	0.17	1	0
DIXMAANK	90	18	19	37	0.29	1	0
DIXMAANK	300	35	36	71	0.95	1	0
DIXMAANL	15	15	16	29	0.17	1	0
DIXMAANL	90	32	33	66	0.48	1	0
DIXMAANL	300	39	40	80	1.02	1	0
DIXON3DQ	10	2	3	4	0.06	0	0
DJTL	2	135	136	185	1.84	-8951.5	0
DQDRTIC	10	2	3	2	0.05	1.6602e-23	0
DQDRTIC	100	2	3	2	0.08	1.6602e-23	0
DQDRTIC	500	2	3	2	0.22	1.6602e-23	0
DQRTIC	100	26	27	47	0.51	4.5801e-07	0
DQRTIC	500	33	34	59	1.33	5.8379e-07	0
EDENSCH	36	12	13	21	0.21	219.28	0
EIGENALS	110	20	21	70	1.01	1.022e-10	0
EIGENALS	420	35	36	120	15.00	1.7732e-11	0
EIGENBLS	110	143	144	1626	13.35	4.8474e-09	0
EIGENBLS	420	386	387	8835	461.21	1.326e-07	0
EIGENCLS	462	463	464	4768	424.16	1.5242e-09	0
ENGVAL1	100	7	8	14	0.19	109.09	0
ENGVAL1	2	7	8	12	0.12	0	0
ERRINROS	10	46	47	85	0.67	6.6946	0
ERRINROS	50	55	56	106	0.94	39.904	0

Table 70: NMTR1 with band preconditioning and $p = 5$ on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.19	0.24051	0
EXTROSNB	5	39	40	77	0.57	1.4048e-15	0
FLETCBV2	100	1	2	2	0.07	-0.51401	0
FLETCBV3	100	10000	10001	20356	218.22	-1656.3	1
FLETCHBV	10	320	321	592	4.57	-2.0742e+06	0
FLETCHBV	100	10000	10001	16863	176.88	-1.4795e+11	1
FLETCHCR	10	26	27	52	0.39	2.0952e-18	0
FLETCHCR	100	144	145	288	2.74	1.1673e-17	0
FMINSURF	121	75	76	206	2.11	1	0
FMINSURF	16	17	18	35	0.28	1	0
FREUROTH	100	10	11	17	0.24	11965	0
FREUROTH	2	9	10	14	0.15	48.984	0
FREUROTH	50	10	11	17	0.21	5881	0
FREUROTH	500	10	11	17	0.59	60634	0
GENROSE	10	30	31	58	0.46	1	0
GENROSE	100	98	99	211	1.83	1	0
GENROSE	500	555	556	1124	20.23	1	0
GROWTHLS	3	120	121	202	1.71	1.004	0
GULF	3	31	32	59	0.63	2.5375e-14	0
HAIRY	2	85	86	133	0.78	20	0
HATFLDD	3	19	20	37	0.30	6.6151e-08	0
HATFLDE	3	22	23	43	0.38	5.1204e-07	0
HEART6LS	6	1603	1604	3080	24.85	7.278e-14	0
HELIX	3	12	13	23	0.19	2.9584e-13	0
HILBERTA	2	2	3	2	0.04	6.656e-31	0
HILBERTB	5	2	3	2	0.04	1.5953e-29	0
HIMMELBB	2	12	13	15	0.20	2.0444e-23	0
HIMMELBF	4	114	115	339	1.78	318.57	0
HIMMELBG	2	8	9	11	0.10	5.1108e-17	0
HIMMELBH	2	1	2	1	0.03	-1	0
HYDC20LS	99	10000	10001	1081072	2604.26	0.067857	1
JENSMP	2	9	10	14	0.16	124.36	0
KOWOSB	4	10	11	20	0.15	0.0003078	0
LIARWHD	100	13	14	37	0.30	9.0888e-21	0
LIARWHD	36	10	11	32	0.20	1.1625e-16	0
LIARWHD	500	15	16	36	0.81	3.7352e-14	0
LOGROS	2	62	63	95	0.85	4.3698e-13	0
MANCINO	100	15	16	23	18.12	9.2449e-18	0
MOREBV	10	2	3	4	0.06	6.582e-14	0
MOREBV	100	1	2	2	0.06	7.887e-10	0
MOREBV	500	1	2	2	0.20	5.9316e-12	0
MSQRTALS	100	17	18	245	1.52	5.5682e-10	0

Table 71: NMTR1 with band preconditioning and $p = 5$ on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.24	6.2623e-12	0
MSQRTALS	49	19	20	143	0.64	1.3997e-10	0
MSQRTBLS	100	22	23	325	1.97	1.088e-09	0
MSQRTBLS	49	17	18	161	0.59	2.0502e-10	0
MSQRTBLS	9	13	14	36	0.22	4.8784e-11	0
NCB20B	100	22	23	931	5.68	196.68	0
NCB20B	50	26	27	651	1.83	99.504	0
NCB20B	500	21	22	727	30.53	897.52	0
NONDIA	100	19	20	47	0.42	2.898e-15	0
NONDIA	50	19	20	48	0.34	6.6466e-13	0
NONDIA	500	18	19	42	0.88	2.4158e-10	0
NONDQUAR	100	15	16	37	0.32	2.2854e-09	0
NONDQUAR	500	16	17	36	0.71	3.9386e-09	0
NONMSQRT	100	10000	10001	2965593	8782.19	18.072	1
NONMSQRT	49	10000	10001	1328696	1602.49	1.0763	1
NONMSQRT	9	71	72	202	1.09	0.75193	0
OSBORNEA	5	40	41	93	0.65	5.4725e-05	0
OSBORNEB	11	19	20	78	0.56	0.040138	0
PALMER1C	8	20	21	174	0.39	0.097605	0
PALMER1D	7	14	15	56	0.26	0.65267	0
PALMER2C	8	19	20	200	0.38	0.014369	0
PALMER3C	8	11	12	78	0.21	0.019539	0
PALMER4C	8	24	25	215	0.44	0.050312	0
PENALTY1	10	42	43	164	0.65	7.1151e-05	0
PENALTY1	100	54	55	620	1.56	0.00090261	0
PENALTY1	50	54	55	460	1.14	0.00043182	0
PENALTY1	500	46	47	469	6.59	0.004779	0
PENALTY2	10	73	74	254	1.18	0.00029385	0
PENALTY2	100	19	20	87	0.61	97096	0
PENALTY2	50	36	37	179	0.75	4.2961	0
PENALTY3	100	49	50	100	36.94	0.00099996	0
PENALTY3	50	43	44	89	7.15	0.001	3
PFIT1LS	3	267	268	521	3.89	6.1521e-07	0
POWELLSG	100	15	16	30	0.33	2.1902e-07	0
POWELLSG	500	15	16	30	0.66	1.1139e-06	0
POWELLSG	20	15	16	30	0.27	4.0054e-08	0
POWELLSG	4	15	16	30	0.24	4.2527e-09	0
POWER	10	16	17	40	0.27	1.1098e-08	0
POWER	100	22	23	66	0.52	5.0264e-09	0
POWER	50	19	20	54	0.37	2.3411e-08	0
POWER	500	26	27	78	2.48	5.9786e-09	0
QUARTC	100	26	27	47	0.53	4.5801e-07	0

Table 72: NMTR1 with band preconditioning and $p = 5$ on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.35	5.2022e-08	0
QUARTC	500	33	34	59	1.34	5.8379e-07	0
ROSENBR	2	26	27	45	0.40	3.2328e-13	0
S308	2	10	11	16	0.16	0.7732	0
SCHMVETT	10	3	4	6	0.05	-24	0
SCHMVETT	500	3	4	6	0.37	-1494	0
SCHMVETT	3	3	4	6	0.04	-3	0
SCHMVETT	500	3	4	6	0.37	-1494	0
SINQUAD	100	41	42	148	0.97	7.6619e-08	0
SINQUAD	5	11	12	22	0.19	1.1721e-08	0
SINQUAD	50	38	39	142	0.76	1.0969e-07	0
SINQUAD	500	89	90	314	5.34	4.0484e-07	0
SISSER	2	12	13	19	0.19	1.1139e-08	0
SNAIL	2	74	75	138	0.70	3.0241e-18	0
SPMSRTLS	100	14	15	26	0.39	3.2303e-13	0
SPMSRTLS	28	12	13	22	0.24	3.2953e-16	0
SPMSRTLS	499	20	21	39	1.50	1.9096e-16	0
SROSENBR	10	6	7	10	0.11	4.6748e-17	0
SROSENBR	100	6	7	10	0.16	4.6748e-16	0
SROSENBR	50	6	7	10	0.14	2.3374e-16	0
SROSENBR	500	10	11	20	0.49	2.9154e-13	0
TOINTGOR	50	9	10	84	0.22	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.08	10	0
TOINTGSS	50	2	3	4	0.05	10	0
TOINTGSS	500	2	3	4	0.23	10	0
TOINTPSP	50	23	24	88	0.46	225.56	0
TOINTQOR	50	6	7	30	0.15	1175.5	0
TQUARTIC	100	12	13	35	0.28	2.7682e-11	0
TQUARTIC	5	1	2	2	0.04	4.4373e-31	0
TQUARTIC	50	10	11	35	0.20	5.2793e-13	0
TQUARTIC	500	15	16	42	0.77	4.787e-15	0
TRIDIA	10	1	2	2	0.04	1.0805e-30	0
TRIDIA	100	2	3	3	0.09	1.352e-32	0
TRIDIA	50	2	3	3	0.07	1.352e-32	0
TRIDIA	500	2	3	3	0.25	1.3482e-32	0
VARDIM	10	14	15	14	0.24	1.595e-26	0
VARDIM	100	25	26	25	0.60	5.171e-26	0
VARDIM	50	22	23	22	0.41	1.2641e-27	0
VARDIM	500	33	34	33	5.05	1.1634e-25	0
VAREIGVL	10	20	21	87	0.31	5.6299e-10	0
VAREIGVL	100	12	13	84	0.39	3.3727e-09	0

Table 73: NMTR1 with band preconditioning and $p = 5$ on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.30	2.9295e-10	0
VAREIGVL	500	12	13	63	1.60	2.0175e-08	0
VIBRBEAM	8	31	32	104	0.72	0.15647	3
WATSON	12	8	9	44	0.22	7.76e-08	0
WATSON	31	10	11	57	0.36	5.0956e-08	0
WOODS	100	15	16	28	0.33	2.0135e-17	0
WOODS	4	15	16	28	0.24	8.0539e-19	0
WOODS	500	16	17	31	0.74	9.8289e-15	0
YFITU	3	46	47	95	0.74	2.1339e-12	0
ZANGWIL2	2	1	2	1	0.02	-18.2	0
PFIT2LS	3	356	357	590	5.08	2.6456e-10	0
PFIT3LS	3	132	133	214	1.92	4.9202e-14	0
PFIT4LS	3	226	227	364	3.39	5.3177e-13	0
EXTROSNB	10	311	312	678	4.61	2.6375e-08	0
EXTROSNB	50	539	540	1077	8.93	1.2991e-07	0
EXTROSNB	100	442	443	883	8.18	2.3978e-07	0

Table 74: NMTR1 with band preconditioning and $p = 5$ on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.71	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.08	1.11e-12	0
BDQRTIC	1000	11	12	24	1.57	3983.8	0
BROYDN7D	1000	64	65	157	5.31	346.66	0
BRYBND	1000	16	17	46	2.53	1.8775e-12	0
BRYBND	5000	24	25	74	18.58	2.3487e-13	0
CRAGGLVY	1000	14	15	25	1.50	336.42	0
CRAGGLVY	5000	14	15	26	7.43	1688.2	0
DIXMAANA	1500	5	6	15	0.92	1	0
DIXMAANA	3000	5	6	15	1.84	1	0
DIXMAANB	1500	7	8	14	1.07	1	0
DIXMAANB	3000	7	8	14	2.11	1	0
DIXMAANC	1500	17	18	28	1.98	1	0
DIXMAANC	3000	14	15	27	3.56	1	0
DIXMAAND	1500	9	10	21	1.27	1	0
DIXMAAND	3000	11	12	24	2.84	1	0
DIXMAANE	1500	6	7	17	1.02	1	0
DIXMAANE	3000	6	7	17	2.01	1	0
DIXMAANF	1500	25	26	46	2.79	1	0
DIXMAANF	3000	30	31	55	6.05	1	0
DIXMAANG	1500	32	33	66	3.36	1	0
DIXMAANG	3000	40	41	77	7.77	1	0
DIXMAANH	1500	44	45	92	4.49	1	0
DIXMAANH	3000	49	50	100	9.92	1	0
DIXMAANI	1500	7	8	23	1.13	1	0
DIXMAANI	3000	7	8	29	2.42	1	0
DIXMAANJ	1500	43	44	100	4.29	1	0
DIXMAANJ	3000	35	36	86	7.19	1	0
DIXMAANK	1500	51	52	125	5.01	1	0
DIXMAANK	3000	32	33	69	6.40	1	0
DIXMAANL	1500	34	35	105	3.68	1	0
DIXMAANL	3000	49	50	167	11.23	1	0
DQDRTIC	1000	2	3	2	0.38	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.79	1.6602e-23	0
DQRTIC	1000	35	36	62	2.38	3.6952e-06	0
DQRTIC	5000	42	43	73	12.81	7.0042e-06	0
EDENSCH	2000	12	13	21	2.42	12003	0
EIGENALS	930	45	46	161	83.40	5.2957e-11	0
EIGENBLS	930	550	551	14023	2623.34	4.078e-07	0
ENGVAL1	1000	7	8	14	0.81	1108.2	0
ENGVAL1	5000	7	8	14	3.84	5548.7	0
FLETCBV2	1000	0	1	0	0.32	-0.50134	0

Table 75: NMTR1 with band preconditioning and $p = 5$ on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1025.85	-1.8877e+06	1
FMINSURF	1024	248	249	617	83.37	1	0
FMINSURF	5625	215	216	659	1652.40	1	0
FREUROTH	1000	10	11	17	1.05	121470	0
FREUROTH	5000	10	11	17	5.04	608160	0
LIARWHD	1000	14	15	35	1.26	2.0274e-20	0
LIARWHD	5000	13	14	28	5.59	6.0958e-16	0
MOREBV	1000	1	2	2	0.37	7.3289e-13	0
MOREBV	5000	1	2	2	1.74	5.8478e-15	0
MSQRTALS	1024	34	35	5734	809.53	4.0303e-09	0
MSQRTALS	529	31	32	3933	167.95	1.7476e-08	0
MSQRTBLS	529	31	32	3282	142.82	1.2563e-08	0
MSQRTBLS	1024	34	35	3663	502.56	4.714e-09	0
NCB20B	1000	22	23	590	50.93	1676	0
NONDIA	1000	23	24	58	1.77	4.1197e-12	0
NONDIA	5000	32	33	80	10.91	5.0265e-15	0
NONDIA	10000	36	37	90	24.37	5.0448e-14	0
NONDQUAR	1000	17	18	36	1.22	1.3932e-09	0
NONDQUAR	5000	18	19	37	5.76	1.0076e-09	0
NONDQUAR	10000	19	20	38	12.16	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	63	64	566	23.78	0.0096862	0
POWELLSG	1000	15	16	30	1.05	2.2324e-06	0
POWELLSG	5000	15	16	32	4.77	5.2976e-06	0
POWELLSG	10000	15	16	32	9.70	1.0595e-05	0
POWER	1000	27	28	80	7.57	1.8888e-08	0
QUARTC	1000	35	36	62	2.34	3.6952e-06	0
QUARTC	5000	42	43	73	12.87	7.0042e-06	0
QUARTC	10000	45	46	78	27.39	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.70	-2994	0
SCHMVETT	5000	3	4	6	3.38	-14994	0
SCHMVETT	10000	3	4	6	6.75	-29994	0
SINQUAD	1000	91	92	318	10.31	3.183e-07	0
SINQUAD	5000	150	151	482	116.94	5.6471e-07	0
SINQUAD	10000	188	189	587	321.91	1.4353e-06	0
SPMSRTLS	1000	25	26	53	3.35	5.6048e-16	0
SPMSRTLS	4999	28	29	58	18.73	3.1885e-11	0
SPMSRTLS	10000	29	30	62	39.34	3.2927e-13	0
SROSENBR	1000	10	11	20	0.81	5.8309e-13	0
SROSENBR	5000	10	11	20	3.70	2.9154e-12	0
SROSENBR	10000	10	11	20	7.51	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.55	7.6524e-11	0

Table 76: NMTR1 with band preconditioning and $p = 5$ on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.43	10	0
TOINTGSS	5000	2	3	4	2.01	10	0
TOINTGSS	10000	2	3	4	4.00	10	0
TQUARTIC	1000	12	13	36	1.18	2.9487e-11	0
TQUARTIC	5000	20	21	51	10.01	1.1107e-10	0
TQUARTIC	10000	18	19	44	23.14	3.5718e-15	0
TRIDIA	1000	2	3	3	0.46	1.3827e-32	0
TRIDIA	5000	2	3	3	2.13	4.1976e-33	0
TRIDIA	10000	2	3	3	4.32	5.3451e-33	0
VARDIM	1000	36	37	36	18.71	1.1203e-20	0
VARDIM	5000	45	46	45	545.97	1.1459e-18	0
VAREIGVL	1000	12	13	70	4.45	5.6139e-08	0
VAREIGVL	5000	13	14	59	83.41	7.7013e-08	0
WOODS	1000	16	17	31	1.23	1.9658e-14	0
WOODS	10000	16	17	31	11.85	1.9658e-13	0
FLETCHCR	1000	1321	1322	2642	79.89	1.5315e-20	0
GENROSE	1000	939	940	1927	54.30	1	0

Table 77: NMTR1 with band preconditioning and $p = 5$ on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	71	72	4559	25.22	0	0
CATENARY	501	906	907	15073	85.15	-348400	0
CHANDHEQ	100	13	14	62	6.79	6.7959e-08	0
CHEMRCTA	100	42	43	646	1.42	4.6918e-16	0
CHEMRCTB	1000	52	53	165	6.25	6.1367e-20	0
CLPLATEC	5041	3	4	3935	199.10	-0.0050207	0
CORKSCRW	456	129	130	76738	225.66	26.484	0
DALLASM	196	82	83	15783	25.44	-48198	0
DISCS	36	344	345	8770	16.95	12	0
DRUGDIS	304	211	212	3821	19.53	4.2452	0
DTOC5	9999	25	26	91	44.74	1.5316	0
EXPFITB	5	62	63	902	2.52	0.0050193	0
EXPFITC	5	84	85	1696	13.66	0.023303	0
FCCU	19	16	17	57	0.34	11.149	0
FLETCHER	4	31	32	64	0.47	19.525	0
GILBERT	500	29	30	71	3.39	237.37	0
GRIDNETA	3444	35	36	3753	89.33	161.61	0
GRIDNETE	3444	27	28	2939	104.96	144.06	0
HADAMARD	257	262	263	16466	213.68	1	0
HAGER3	2001	12	13	32	4.00	0.14096	0
HAGER4	2001	11	12	2294	45.99	2.7942	0
HS114	10	756	757	4517	11.46	-1768.8	0
HS59	2	288	289	564	4.13	-7.8028	0
HS75	4	136	137	545	2.05	5174.4	0
HVYCRASH	204	453	454	3019	16.99	-0.2185	0
HYDROELL	1009	143	144	22557	254.56	-3.5855e+06	0
JUNKTURN	5010	66	67	1025	84.80	9.426e-06	0
KSIP	20	69	70	3794	67.42	0.57579	0
LINVERSE	1999	27	28	1211	54.49	681	0
LMINSURF	1024	342	343	902	32.53	9	0
MANNE	300	6	7	75	0.94	-0.97457	0
MEYER3	3	235	236	590	3.40	87.946	0
MINPERM	51	18	19	141	0.49	0.0384	0
MISTAKE	9	32	33	215	0.60	-1	0
NGONE	50	1134	1135	31185	162.63	-0.64103	0
NLMSURF	1024	952	953	2712	92.73	38.591	0
NYSTROM5	18	28	29	453	0.62	2.4426e-05	0
ODC	10404	19	20	916	144.26	-0.0040122	0
OET1	3	38	39	974	13.23	0.53824	0
OPTCTRL3	122	61	62	249	1.69	2048	0
ORTHREGA	2053	186	187	992	65.20	5661.4	0
ORTHREGC	5005	57	58	415	64.79	94.813	0

Table 78: NMTR1 with band preconditioning and $p = 5$ on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	549	550	2627	13.83	15.59	0
ORTHREGF	1205	181	182	424	21.19	23.698	0
PRODPL1	60	61	62	1271	1.64	35.739	0
QR3D	610	151	152	15862	456.16	3.4241e-09	0
QR3DBD	457	166	167	2398	69.85	6.6211e-10	0
READING1	202	781	782	17539	52.34	-0.16049	0
SEMICON1	102	684	685	1375	20.70	2.2744e-15	0
SEMICON2	1002	134	135	261	28.90	1.6734e-06	0
SIPOW1	2	40	41	1239	31.49	-1	0
SPANHYD	97	25	26	606	1.07	239.74	0
SSC	10404	1	2	93	28.37	-2.0782	0
SSEBNLN	194	65	66	1479	3.25	1.6171e+07	0
SSNLBEAM	3003	239	240	7246	272.73	340.03	0
STEENBRE	540	7991	7992	215107	472.54	27646	0
TENBARS1	18	347	348	4423	6.31	2295.4	0
TENBARS2	18	280	281	2247	4.66	2277.9	0
TRAINF	408	43	44	1275	5.23	3.0975	0
TRUSPYR1	11	805	806	3685	12.48	11.229	0
UBH5	1010	92	93	23388	146.67	1.1163	0
WATER	31	40	41	393	0.79	10549	0
ZIGZAG	304	89	90	17835	43.35	33.787	0

Table 79: NMTR1 with band preconditioning and $p = 5$ on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.15	5.7444	0
ARWHEAD	100	5	6	7	0.14	0	0
ARWHEAD	500	5	6	6	0.37	1.3237e-09	0
BARD	3	7	8	13	0.11	0.0082149	0
BDQRTIC	100	11	12	23	0.30	378.77	0
BDQRTIC	500	11	12	24	0.82	1981	0
BEALE	2	7	8	14	0.13	2.9425e-14	0
BIGGS6	6	50	51	106	0.74	3.2151e-09	0
BOX3	3	7	8	13	0.11	1.9221e-11	0
BRKMCC	2	3	4	5	0.07	0.16904	0
BROWNAL	10	5	6	42	0.11	9.2726e-11	0
BROWNBS	2	34	35	50	0.49	0	0
BROWNDEN	4	11	12	20	0.19	85822	0
BROYDN7D	10	16	17	32	0.24	1.2611	0
BROYDN7D	100	30	31	65	0.62	29.362	0
BROYDN7D	500	51	52	119	2.44	169.56	0
BRYBND	10	11	12	36	0.17	7.2241e-15	0
BRYBND	100	12	13	38	0.37	1.3572e-12	0
BRYBND	500	15	16	43	1.27	1.7435e-13	0
CHNROSNB	10	25	26	50	0.39	4.308e-21	0
CLIFF	2	27	28	30	0.40	0.19979	0
CRAGGLVY	100	14	15	25	0.33	32.27	0
CRAGGLVY	4	16	17	30	0.24	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.83	167.45	0
CUBE	2	32	33	59	0.44	7.6271e-15	0
DENSCHNA	2	5	6	9	0.10	1.2e-15	0
DENSCHNB	2	3	4	5	0.06	0	0
DENSCHNC	2	9	10	13	0.15	1.8423e-13	0
DENSCHND	3	33	34	63	0.49	8.6576e-09	0
DENSCHNE	3	11	12	16	0.17	2.4642e-12	0
DENSCHNF	2	6	7	12	0.11	6.5139e-22	0
DIXMAANA	15	5	6	9	0.07	1	0
DIXMAANA	90	5	6	14	0.11	1	0
DIXMAANA	300	5	6	14	0.23	1	0
DIXMAANB	15	6	7	11	0.08	1	0
DIXMAANB	90	8	9	18	0.15	1	0
DIXMAANB	300	7	8	13	0.27	1	0
DIXMAANC	15	9	10	15	0.11	1	0
DIXMAANC	90	9	10	16	0.17	1	0
DIXMAANC	300	11	12	20	0.38	1	0
DIXMAAND	15	9	10	16	0.10	1	0
DIXMAAND	90	10	11	21	0.18	1	0

Table 80: NMTR1 with band preconditioning and $p = 10$ on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.37	1	0
DIXMAANE	15	6	7	12	0.08	1	0
DIXMAANE	90	6	7	16	0.13	1	0
DIXMAANE	300	6	7	16	0.25	1	0
DIXMAANF	15	10	11	20	0.12	1	0
DIXMAANF	90	10	11	21	0.17	1	0
DIXMAANF	300	35	36	74	0.97	1	0
DIXMAANG	15	11	12	22	0.12	1	0
DIXMAANG	90	16	17	33	0.26	1	0
DIXMAANG	300	24	25	47	0.72	1	0
DIXMAANH	15	13	14	26	0.15	1	0
DIXMAANH	90	19	20	40	0.30	1	0
DIXMAANH	300	26	27	49	0.74	1	0
DIXMAANI	15	5	6	11	0.06	1	0
DIXMAANI	90	6	7	15	0.13	1	0
DIXMAANI	300	6	7	15	0.25	1	0
DIXMAANJ	15	12	13	24	0.13	1	0
DIXMAANJ	90	20	21	42	0.31	1	0
DIXMAANJ	300	21	22	43	0.65	1	0
DIXMAANK	15	16	17	32	0.17	1	0
DIXMAANK	90	18	19	37	0.29	1	0
DIXMAANK	300	37	38	75	1.00	1	0
DIXMAANL	15	15	16	29	0.15	1	0
DIXMAANL	90	32	33	66	0.47	1	0
DIXMAANL	300	42	43	86	1.08	1	0
DIXON3DQ	10	2	3	4	0.05	0	0
DJTL	2	135	136	185	1.81	-8951.5	0
DQDRTIC	10	2	3	2	0.05	1.6602e-23	0
DQDRTIC	100	2	3	2	0.09	1.6602e-23	0
DQDRTIC	500	2	3	2	0.21	1.6602e-23	0
DQRTIC	100	26	27	47	0.50	4.5801e-07	0
DQRTIC	500	33	34	59	1.30	5.8379e-07	0
EDENSCH	36	12	13	21	0.22	219.28	0
EIGENALS	110	20	21	70	1.01	1.022e-10	0
EIGENALS	420	35	36	120	14.92	1.7732e-11	0
EIGENBLS	110	117	118	1386	11.08	3.3789e-09	0
EIGENBLS	420	344	345	8038	414.64	4.1063e-08	0
EIGENCLS	462	323	324	3772	311.72	4.2038e-10	0
ENGVAL1	100	7	8	14	0.19	109.09	0
ENGVAL1	2	7	8	12	0.12	0	0
ERRINROS	10	46	47	85	0.68	6.6946	0
ERRINROS	50	50	51	97	0.83	39.904	0

Table 81: NMTR1 with band preconditioning and $p = 10$ on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.19	0.24051	0
EXTROSNB	5	39	40	77	0.57	1.8953e-18	0
FLETCBV2	100	1	2	2	0.07	-0.51401	0
FLETCBV3	100	10000	10001	20356	217.51	-1656.3	1
FLETCHBV	10	320	321	592	4.39	-2.0742e+06	0
FLETCHBV	100	10000	10001	16863	173.97	-1.4795e+11	1
FLETCHCR	10	26	27	52	0.39	2.0952e-18	0
FLETCHCR	100	144	145	288	2.72	1.1673e-17	0
FMINSURF	121	74	75	204	2.11	1	0
FMINSURF	16	17	18	35	0.28	1	0
FREUROTH	100	10	11	17	0.24	11965	0
FREUROTH	2	9	10	14	0.14	48.984	0
FREUROTH	50	10	11	17	0.20	5881	0
FREUROTH	500	10	11	17	0.59	60634	0
GENROSE	10	30	31	58	0.47	1	0
GENROSE	100	73	74	161	1.36	1	0
GENROSE	500	493	494	1005	17.65	1	0
GROWTHLS	3	109	110	184	1.56	1.004	0
GULF	3	31	32	59	0.64	3.4161e-15	0
HAIRY	2	74	75	114	0.65	20	0
HATFLDD	3	19	20	37	0.29	6.6151e-08	0
HATFLDE	3	22	23	43	0.34	5.1204e-07	0
HEART6LS	6	1169	1170	2349	16.73	6.3985e-11	0
HELIX	3	12	13	23	0.17	2.9584e-13	0
HILBERTA	2	2	3	2	0.03	6.656e-31	0
HILBERTB	5	2	3	2	0.04	1.5953e-29	0
HIMMELBB	2	12	13	15	0.18	2.0444e-23	0
HIMMELBF	4	95	96	292	1.35	318.57	0
HIMMELBG	2	8	9	11	0.08	5.1108e-17	0
HIMMELBH	2	1	2	1	0.03	-1	0
HYDC20LS	99	10000	10001	1104038	2627.67	0.065999	1
JENSMP	2	9	10	14	0.14	124.36	0
KOWOSB	4	10	11	20	0.14	0.0003078	0
LIARWHD	100	13	14	37	0.31	9.0888e-21	0
LIARWHD	36	10	11	32	0.19	1.1625e-16	0
LIARWHD	500	15	16	36	0.77	3.7352e-14	0
LOGROS	2	38	39	54	0.54	6.0976e-12	0
MANCINO	100	15	16	23	17.60	9.2449e-18	0
MOREBV	10	2	3	4	0.05	6.582e-14	0
MOREBV	100	1	2	2	0.07	7.887e-10	0
MOREBV	500	1	2	2	0.20	5.9316e-12	0
MSQRTALS	100	17	18	245	1.52	5.5682e-10	0

Table 82: NMTR1 with band preconditioning and $p = 10$ on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.23	6.2623e-12	0
MSQRTALS	49	19	20	143	0.60	1.3997e-10	0
MSQRTBLS	100	24	25	379	2.19	4.8675e-10	0
MSQRTBLS	49	17	18	161	0.58	2.0502e-10	0
MSQRTBLS	9	13	14	36	0.20	4.8784e-11	0
NCB20B	100	22	23	931	5.51	196.68	0
NCB20B	50	26	27	651	1.82	99.504	0
NCB20B	500	21	22	727	30.29	897.52	0
NONDIA	100	19	20	47	0.39	2.898e-15	0
NONDIA	50	19	20	48	0.33	6.6466e-13	0
NONDIA	500	18	19	42	0.85	2.4158e-10	0
NONDQUAR	100	15	16	37	0.33	2.2854e-09	0
NONDQUAR	500	16	17	36	0.71	3.9386e-09	0
NONMSQRT	100	10000	10001	2965593	8668.67	18.072	1
NONMSQRT	49	10000	10001	1328696	1575.94	1.0763	1
NONMSQRT	9	63	64	168	0.92	0.75193	0
OSBORNEA	5	40	41	92	0.64	5.4679e-05	0
OSBORNEB	11	19	20	78	0.50	0.040138	0
PALMER1C	8	20	21	174	0.37	0.097605	0
PALMER1D	7	14	15	56	0.24	0.65267	0
PALMER2C	8	19	20	200	0.35	0.014369	0
PALMER3C	8	11	12	78	0.20	0.019539	0
PALMER4C	8	24	25	215	0.42	0.050312	0
PENALTY1	10	40	41	171	0.56	7.0981e-05	0
PENALTY1	100	48	49	617	1.42	0.00090275	0
PENALTY1	50	45	46	461	0.93	0.0004319	0
PENALTY1	500	50	51	566	6.94	0.0047795	0
PENALTY2	10	71	72	247	1.06	0.00029385	0
PENALTY2	100	19	20	87	0.57	97096	0
PENALTY2	50	30	31	154	0.65	4.2961	0
PENALTY3	100	22	23	55	20.93	0.001	0
PENALTY3	50	21	22	56	4.13	0.001	0
PFIT1LS	3	211	212	384	2.97	1.0486e-06	0
POWELLSG	100	15	16	30	0.31	2.1902e-07	0
POWELLSG	500	15	16	30	0.64	1.1139e-06	0
POWELLSG	20	15	16	30	0.23	4.0054e-08	0
POWELLSG	4	15	16	30	0.22	4.2527e-09	0
POWER	10	16	17	40	0.26	1.1098e-08	0
POWER	100	22	23	66	0.50	5.0264e-09	0
POWER	50	19	20	54	0.34	2.3411e-08	0
POWER	500	26	27	78	2.44	5.9786e-09	0
QUARTC	100	26	27	47	0.49	4.5801e-07	0

Table 83: NMTR1 with band preconditioning and $p = 10$ on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.34	5.2022e-08	0
QUARTC	500	33	34	59	1.33	5.8379e-07	0
ROSENBR	2	26	27	45	0.38	3.2328e-13	0
S308	2	10	11	16	0.16	0.7732	0
SCHMVETT	10	3	4	6	0.05	-24	0
SCHMVETT	500	3	4	6	0.36	-1494	0
SCHMVETT	3	3	4	6	0.04	-3	0
SCHMVETT	500	3	4	6	0.36	-1494	0
SINQUAD	100	41	42	148	0.95	7.6619e-08	0
SINQUAD	5	11	12	22	0.17	1.1721e-08	0
SINQUAD	50	33	34	124	0.62	1.4352e-07	0
SINQUAD	500	51	52	158	2.98	1.9161e-08	0
SISSER	2	12	13	19	0.18	1.1139e-08	0
SNAIL	2	65	66	117	0.61	1.6803e-13	0
SPMSRTLS	100	14	15	26	0.39	3.2303e-13	0
SPMSRTLS	28	12	13	22	0.21	3.2953e-16	0
SPMSRTLS	499	20	21	39	1.52	1.9096e-16	0
SROSENBR	10	6	7	10	0.10	4.6748e-17	0
SROSENBR	100	6	7	10	0.15	4.6748e-16	0
SROSENBR	50	6	7	10	0.13	2.3374e-16	0
SROSENBR	500	10	11	20	0.47	2.9154e-13	0
TOINTGOR	50	9	10	84	0.21	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.07	10	0
TOINTGSS	50	2	3	4	0.05	10	0
TOINTGSS	500	2	3	4	0.23	10	0
TOINTPSP	50	23	24	88	0.44	225.56	0
TOINTQOR	50	6	7	30	0.13	1175.5	0
TQUARTIC	100	12	13	35	0.28	2.7682e-11	0
TQUARTIC	5	1	2	2	0.04	4.4373e-31	0
TQUARTIC	50	10	11	35	0.19	5.2793e-13	0
TQUARTIC	500	15	16	42	0.74	4.787e-15	0
TRIDIA	10	1	2	2	0.04	1.0805e-30	0
TRIDIA	100	2	3	3	0.09	1.352e-32	0
TRIDIA	50	2	3	3	0.06	1.352e-32	0
TRIDIA	500	2	3	3	0.25	1.3482e-32	0
VARDIM	10	14	15	14	0.22	1.595e-26	0
VARDIM	100	25	26	25	0.59	5.171e-26	0
VARDIM	50	22	23	22	0.39	1.2641e-27	0
VARDIM	500	33	34	33	5.02	1.1634e-25	0
VAREIGVL	10	25	26	101	0.38	1.5829e-10	0
VAREIGVL	100	12	13	84	0.38	3.3727e-09	0

Table 84: NMTR1 with band preconditioning and $p = 10$ on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.30	2.9295e-10	0
VAREIGVL	500	12	13	63	1.60	2.0175e-08	0
VIBRBEAM	8	31	32	104	0.68	0.15647	3
WATSON	12	8	9	44	0.22	7.76e-08	0
WATSON	31	10	11	57	0.37	5.0956e-08	0
WOODS	100	15	16	28	0.32	2.0135e-17	0
WOODS	4	15	16	28	0.23	8.0539e-19	0
WOODS	500	16	17	31	0.72	9.8289e-15	0
YFITU	3	37	38	73	0.55	1.9632e-08	0
ZANGWIL2	2	1	2	1	0.03	-18.2	0
PFIT2LS	3	95	96	172	1.30	3.9148e-13	0
PFIT3LS	3	102	103	161	1.44	1.4352e-12	0
PFIT4LS	3	163	164	273	2.22	6.9861e-13	0
EXTROSNB	10	307	308	644	4.40	1.5246e-08	0
EXTROSNB	50	430	431	859	6.93	2.3194e-07	0
EXTROSNB	100	460	461	919	8.30	2.0432e-07	0

Table 85: NMTR1 with band preconditioning and $p = 10$ on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.69	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.05	1.11e-12	0
BDQRTIC	1000	11	12	24	1.57	3983.8	0
BROYDN7D	1000	65	66	158	5.43	346.67	0
BRYBND	1000	16	17	46	2.48	1.8775e-12	0
BRYBND	5000	24	25	74	18.52	2.3487e-13	0
CRAGGLVY	1000	14	15	25	1.51	336.42	0
CRAGGLVY	5000	14	15	26	7.39	1688.2	0
DIXMAANA	1500	5	6	15	0.91	1	0
DIXMAANA	3000	5	6	15	1.83	1	0
DIXMAANB	1500	7	8	14	1.06	1	0
DIXMAANB	3000	7	8	14	2.11	1	0
DIXMAANC	1500	17	18	28	1.97	1	0
DIXMAANC	3000	14	15	27	3.58	1	0
DIXMAAND	1500	9	10	21	1.27	1	0
DIXMAAND	3000	11	12	24	2.81	1	0
DIXMAANE	1500	6	7	17	1.02	1	0
DIXMAANE	3000	6	7	17	2.01	1	0
DIXMAANF	1500	25	26	46	2.74	1	0
DIXMAANF	3000	36	37	66	7.05	1	0
DIXMAANG	1500	34	35	70	3.54	1	0
DIXMAANG	3000	52	53	98	9.68	1	0
DIXMAANH	1500	48	49	96	4.75	1	0
DIXMAANH	3000	64	65	131	12.36	1	0
DIXMAANI	1500	7	8	23	1.12	1	0
DIXMAANI	3000	7	8	29	2.39	1	0
DIXMAANJ	1500	55	56	125	5.25	1	0
DIXMAANJ	3000	35	36	86	7.19	1	0
DIXMAANK	1500	63	64	133	5.84	1	0
DIXMAANK	3000	32	33	69	6.37	1	0
DIXMAANL	1500	39	40	183	4.98	1	0
DIXMAANL	3000	57	58	122	10.89	1	0
DQDRTIC	1000	2	3	2	0.38	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.79	1.6602e-23	0
DQRTIC	1000	35	36	62	2.35	3.6952e-06	0
DQRTIC	5000	42	43	73	12.80	7.0042e-06	0
EDENSCH	2000	12	13	21	2.43	12003	0
EIGENALS	930	43	44	160	80.27	2.5686e-11	0
EIGENBLS	930	452	453	13558	2383.01	6.9336e-07	0
ENGVAL1	1000	7	8	14	0.79	1108.2	0
ENGVAL1	5000	7	8	14	3.78	5548.7	0
FLETCBV2	1000	0	1	0	0.31	-0.50134	0

Table 86: NMTR1 with band preconditioning and $p = 10$ on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1013.39	-1.8877e+06	1
FMINSURF	1024	287	288	703	96.28	1	0
FMINSURF	5625	276	277	895	2146.99	1	0
FREUROTH	1000	10	11	17	1.05	121470	0
FREUROTH	5000	10	11	17	5.01	608160	0
LIARWHD	1000	14	15	35	1.26	2.0274e-20	0
LIARWHD	5000	13	14	28	5.57	6.0958e-16	0
MOREBV	1000	1	2	2	0.37	7.3289e-13	0
MOREBV	5000	1	2	2	1.74	5.8478e-15	0
MSQRTALS	1024	37	38	4622	669.99	9.7882e-09	0
MSQRTALS	529	21	22	1985	89.39	4.0963e-08	0
MSQRTBLS	529	31	32	3282	143.60	1.2563e-08	0
MSQRTBLS	1024	24	25	2024	317.39	4.5054e-09	0
NCB20B	1000	22	23	590	50.71	1676	0
NONDIA	1000	23	24	58	1.76	4.1197e-12	0
NONDIA	5000	32	33	80	10.86	5.0265e-15	0
NONDIA	10000	33	34	81	22.61	1.2547e-07	0
NONDQUAR	1000	17	18	36	1.23	1.3932e-09	0
NONDQUAR	5000	18	19	37	5.72	1.0076e-09	0
NONDQUAR	10000	19	20	38	12.17	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	57	58	576	22.30	0.0096862	0
POWELLSG	1000	15	16	30	1.09	2.2324e-06	0
POWELLSG	5000	15	16	32	4.79	5.2976e-06	0
POWELLSG	10000	15	16	32	9.73	1.0595e-05	0
POWER	1000	27	28	80	7.57	1.8888e-08	0
QUARTC	1000	35	36	62	2.39	3.6952e-06	0
QUARTC	5000	42	43	73	12.85	7.0042e-06	0
QUARTC	10000	45	46	78	27.16	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.71	-2994	0
SCHMVETT	5000	3	4	6	3.44	-14994	0
SCHMVETT	10000	3	4	6	6.89	-29994	0
SINQUAD	1000	60	61	191	6.91	2.6153e-08	0
SINQUAD	5000	135	136	432	106.73	2.7087e-08	0
SINQUAD	10000	158	159	484	270.35	1.513e-06	0
SPMSRTLS	1000	25	26	53	3.40	5.6048e-16	0
SPMSRTLS	4999	27	28	55	17.97	3.0578e-11	0
SPMSRTLS	10000	33	34	71	43.60	3.7675e-15	0
SROSENBR	1000	10	11	20	0.82	5.8309e-13	0
SROSENBR	5000	10	11	20	3.75	2.9154e-12	0
SROSENBR	10000	10	11	20	7.58	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.57	7.6524e-11	0

Table 87: NMTR1 with band preconditioning and $p = 10$ on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.43	10	0
TOINTGSS	5000	2	3	4	2.02	10	0
TOINTGSS	10000	2	3	4	4.02	10	0
TQUARTIC	1000	12	13	36	1.18	2.9487e-11	0
TQUARTIC	5000	20	21	51	10.05	1.1107e-10	0
TQUARTIC	10000	18	19	44	23.21	3.5718e-15	0
TRIDIA	1000	2	3	3	0.49	1.3827e-32	0
TRIDIA	5000	2	3	3	2.23	4.1976e-33	0
TRIDIA	10000	2	3	3	4.46	5.3451e-33	0
VARDIM	1000	36	37	36	18.90	1.1203e-20	0
VARDIM	5000	45	46	45	549.56	1.1459e-18	0
VAREIGVL	1000	12	13	70	4.48	5.6139e-08	0
VAREIGVL	5000	13	14	59	84.48	7.7013e-08	0
WOODS	1000	16	17	31	1.25	1.9658e-14	0
WOODS	10000	16	17	31	11.94	1.9658e-13	0
FLETCHCR	1000	1321	1322	2642	81.37	1.5315e-20	0
GENROSE	1000	1084	1085	2196	65.81	1	0

Table 88: NMTR1 with band preconditioning and $p = 10$ on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	78	79	4814	26.95	0	0
CATENARY	501	906	907	15073	85.06	-348400	0
CHANDHEQ	100	13	14	62	6.84	6.7959e-08	0
CHEMRCTA	100	36	37	608	1.26	5.102e-15	0
CHEMRCTB	1000	63	64	210	7.78	2.135e-10	0
CLPLATEC	5041	3	4	3935	201.26	-0.0050207	0
CORKSCRW	456	129	130	76738	224.67	26.484	0
DALLASM	196	82	83	15783	25.58	-48198	0
DISCS	36	459	460	17420	30.18	12	0
DRUGDIS	304	211	212	3821	19.55	4.2452	0
DTOC5	9999	25	26	91	44.86	1.5316	0
EXPFITB	5	62	63	902	2.53	0.0050193	0
EXPFITC	5	84	85	1696	13.72	0.023303	0
FCCU	19	16	17	57	0.33	11.149	0
FLETCHER	4	31	32	64	0.50	19.525	0
GILBERT	500	29	30	71	3.40	237.37	0
GRIDNETA	3444	35	36	3753	90.98	161.61	0
GRIDNETE	3444	27	28	2939	106.03	144.06	0
HADAMARD	257	492	493	58607	724.95	1	0
HAGER3	2001	12	13	32	4.05	0.14096	0
HAGER4	2001	11	12	2294	46.43	2.7942	0
HS114	10	826	827	4548	12.39	-1768.8	0
HS59	2	263	264	518	3.87	-7.8028	0
HS75	4	137	138	550	2.05	5174.4	0
HVYCRASH	204	255	256	2668	11.44	-0.2185	0
HYDROELL	1009	143	144	22557	257.93	-3.5855e+06	0
JUNKTURN	5010	64	65	897	77.21	9.4471e-06	0
KSIP	20	69	70	3794	67.85	0.57579	0
LINVERSE	1999	25	26	963	44.09	681	0
LMINSURF	1024	315	316	849	30.13	9	0
MANNE	300	6	7	75	0.95	-0.97457	0
MEYER3	3	201	202	498	2.98	87.946	0
MINPERM	51	18	19	141	0.52	0.0384	0
MISTAKE	9	32	33	215	0.60	-1	0
NGONE	50	1134	1135	31185	164.37	-0.64103	0
NLMSURF	1024	912	913	2684	90.00	38.591	0
NYSTROM5	18	28	29	453	0.66	2.4426e-05	0
ODC	10404	19	20	916	144.31	-0.0040122	0
OET1	3	38	39	974	13.38	0.53824	0
OPTCTRL3	122	61	62	249	1.71	2048	0
ORTHREGA	2053	187	188	979	66.00	5661.4	0
ORTHREGC	5005	57	58	415	65.14	94.813	0

Table 89: NMTR1 with band preconditioning and $p = 10$ on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	547	548	2636	14.38	15.59	0
ORTHREGF	1205	156	157	379	18.79	22.22	0
PRODPL1	60	57	58	1124	1.54	35.739	0
QR3D	610	118	119	14308	407.02	4.1192e-09	0
QR3DBD	457	155	156	2179	64.71	3.4574e-10	0
READING1	202	781	782	17564	53.02	-0.16049	0
SEMICON1	102	587	588	1121	17.66	6.5205e-17	0
SEMICON2	1002	134	135	261	28.97	1.6734e-06	0
SIPOW1	2	40	41	1239	31.83	-1	0
SPANHYD	97	30	31	524	1.06	239.74	0
SSC	10404	1	2	93	28.31	-2.0782	0
SSEBNLN	194	67	68	1465	3.32	1.6171e+07	0
SSNLBEAM	3003	239	240	7246	274.81	340.03	0
STEENBRE	540	919	920	50604	102.90	27459	0
TENBARS1	18	587	588	7405	10.86	2295.4	0
TENBARS2	18	288	289	2401	4.89	2277.9	0
TRAINF	408	43	44	1275	5.42	3.0975	0
TRUSPYR1	11	571	572	2687	9.01	11.229	0
UBH5	1010	80	81	22512	141.51	1.1163	0
WATER	31	39	40	373	0.77	10549	0
ZIGZAG	304	89	90	17835	43.58	33.787	0

Table 90: NMTR1 with band preconditioning and $p = 10$ on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.14	5.7444	0
ARWHEAD	100	5	6	7	0.15	0	0
ARWHEAD	500	5	6	6	0.37	1.3237e-09	0
BARD	3	7	8	13	0.12	0.0082149	0
BDQRTIC	100	11	12	23	0.30	378.77	0
BDQRTIC	500	11	12	24	0.83	1981	0
BEALE	2	7	8	14	0.12	2.9425e-14	0
BIGGS6	6	71	72	154	1.05	2.0041e-10	0
BOX3	3	7	8	13	0.12	1.9221e-11	0
BRKMCC	2	3	4	5	0.06	0.16904	0
BROWNAL	10	5	6	42	0.10	9.2726e-11	0
BROWNBS	2	34	35	50	0.50	0	0
BROWNDEN	4	11	12	20	0.18	85822	0
BROYDN7D	10	16	17	32	0.26	1.2611	0
BROYDN7D	100	30	31	65	0.66	29.362	0
BROYDN7D	500	48	49	108	2.41	169.56	0
BRYBND	10	11	12	36	0.21	7.2241e-15	0
BRYBND	100	12	13	38	0.39	1.3572e-12	0
BRYBND	500	15	16	43	1.33	1.7435e-13	0
CHNROSNB	10	25	26	50	0.40	4.308e-21	0
CLIFF	2	27	28	30	0.41	0.19979	0
CRAGGLVY	100	14	15	25	0.37	32.27	0
CRAGGLVY	4	16	17	30	0.23	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.83	167.45	0
CUBE	2	32	33	59	0.46	7.6271e-15	0
DENSCHNA	2	5	6	9	0.10	1.2e-15	0
DENSCHNB	2	3	4	5	0.06	0	0
DENSCHNC	2	9	10	13	0.15	1.8423e-13	0
DENSCHND	3	33	34	63	0.52	8.6576e-09	0
DENSCHNE	3	11	12	16	0.19	2.4642e-12	0
DENSCHNF	2	6	7	12	0.12	6.5139e-22	0
DIXMAANA	15	5	6	9	0.09	1	0
DIXMAANA	90	5	6	14	0.11	1	0
DIXMAANA	300	5	6	14	0.24	1	0
DIXMAANB	15	6	7	11	0.09	1	0
DIXMAANB	90	8	9	18	0.16	1	0
DIXMAANB	300	7	8	13	0.27	1	0
DIXMAANC	15	9	10	15	0.12	1	0
DIXMAANC	90	9	10	16	0.17	1	0
DIXMAANC	300	11	12	20	0.38	1	0
DIXMAAND	15	9	10	16	0.11	1	0
DIXMAAND	90	10	11	21	0.19	1	0

Table 91: NMTR1 with band preconditioning and $p = 15$ on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.39	1	0
DIXMAANE	15	6	7	12	0.08	1	0
DIXMAANE	90	6	7	16	0.13	1	0
DIXMAANE	300	6	7	16	0.26	1	0
DIXMAANF	15	10	11	20	0.12	1	0
DIXMAANF	90	10	11	21	0.17	1	0
DIXMAANF	300	37	38	77	1.01	1	0
DIXMAANG	15	11	12	22	0.12	1	0
DIXMAANG	90	16	17	33	0.27	1	0
DIXMAANG	300	24	25	47	0.72	1	0
DIXMAANH	15	13	14	26	0.15	1	0
DIXMAANH	90	19	20	40	0.31	1	0
DIXMAANH	300	26	27	49	0.75	1	0
DIXMAANI	15	5	6	11	0.07	1	0
DIXMAANI	90	6	7	15	0.13	1	0
DIXMAANI	300	6	7	15	0.25	1	0
DIXMAANJ	15	12	13	24	0.14	1	0
DIXMAANJ	90	20	21	42	0.29	1	0
DIXMAANJ	300	21	22	43	0.65	1	0
DIXMAANK	15	16	17	32	0.16	1	0
DIXMAANK	90	18	19	37	0.29	1	0
DIXMAANK	300	37	38	75	1.02	1	0
DIXMAANL	15	15	16	29	0.16	1	0
DIXMAANL	90	32	33	66	0.48	1	0
DIXMAANL	300	49	50	101	1.25	1	0
DIXON3DQ	10	2	3	4	0.05	0	0
DJTL	2	135	136	185	1.81	-8951.5	0
DQDRTIC	10	2	3	2	0.05	1.6602e-23	0
DQDRTIC	100	2	3	2	0.08	1.6602e-23	0
DQDRTIC	500	2	3	2	0.22	1.6602e-23	0
DQRTIC	100	26	27	47	0.53	4.5801e-07	0
DQRTIC	500	33	34	59	1.37	5.8379e-07	0
EDENSCH	36	12	13	21	0.22	219.28	0
EIGENALS	110	20	21	70	1.01	1.022e-10	0
EIGENALS	420	35	36	120	14.94	1.7732e-11	0
EIGENBLS	110	96	97	1166	9.20	3.1862e-09	0
EIGENBLS	420	194	195	6890	310.74	3.8653e-08	0
EIGENCLS	462	391	392	4283	368.86	1.0834e-09	0
ENGVAL1	100	7	8	14	0.18	109.09	0
ENGVAL1	2	7	8	12	0.13	0	0
ERRINROS	10	46	47	85	0.69	6.6946	0
ERRINROS	50	50	51	97	0.84	39.904	0

Table 92: NMTR1 with band preconditioning and $p = 15$ on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.19	0.24051	0
EXTROSNB	5	34	35	67	0.49	1.0288e-12	0
FLETCBV2	100	1	2	2	0.07	-0.51401	0
FLETCBV3	100	10000	10001	20356	222.21	-1656.3	1
FLETCHBV	10	320	321	592	4.94	-2.0742e+06	0
FLETCHBV	100	10000	10001	16863	181.74	-1.4795e+11	1
FLETCHCR	10	26	27	52	0.40	2.0952e-18	0
FLETCHCR	100	144	145	288	2.83	1.1673e-17	0
FMINSURF	121	84	85	217	2.49	1	0
FMINSURF	16	17	18	35	0.29	1	0
FREUROTH	100	10	11	17	0.26	11965	0
FREUROTH	2	9	10	14	0.16	48.984	0
FREUROTH	50	10	11	17	0.21	5881	0
FREUROTH	500	10	11	17	0.61	60634	0
GENROSE	10	30	31	58	0.45	1	0
GENROSE	100	73	74	164	1.53	1	0
GENROSE	500	533	534	1079	20.10	1	0
GROWTHLS	3	85	86	144	1.28	1.004	0
GULF	3	31	32	59	0.67	2.5375e-14	0
HAIRY	2	68	69	111	0.65	20	0
HATFLDD	3	19	20	37	0.31	6.6151e-08	0
HATFLDE	3	22	23	43	0.36	5.1204e-07	0
HEART6LS	6	910	911	1833	13.46	1.0299e-11	0
HELIX	3	12	13	23	0.19	2.9584e-13	0
HILBERTA	2	2	3	2	0.03	6.656e-31	0
HILBERTB	5	2	3	2	0.04	1.5953e-29	0
HIMMELBB	2	12	13	15	0.20	2.0444e-23	0
HIMMELBF	4	62	63	192	0.95	318.57	0
HIMMELBG	2	8	9	11	0.08	5.1108e-17	0
HIMMELBH	2	1	2	1	0.03	-1	0
HYDC20LS	99	10000	10001	1106571	2603.02	0.063789	1
JENSMP	2	9	10	14	0.15	124.36	0
KOWOSB	4	10	11	20	0.16	0.0003078	0
LIARWHD	100	13	14	37	0.31	9.0888e-21	0
LIARWHD	36	10	11	32	0.20	1.1625e-16	0
LIARWHD	500	15	16	36	0.78	3.7352e-14	0
LOGROS	2	38	39	54	0.53	6.0976e-12	0
MANCINO	100	15	16	23	17.62	9.2449e-18	0
MOREBV	10	2	3	4	0.06	6.582e-14	0
MOREBV	100	1	2	2	0.07	7.887e-10	0
MOREBV	500	1	2	2	0.21	5.9316e-12	0
MSQRTALS	100	17	18	245	1.57	5.5682e-10	0

Table 93: NMTR1 with band preconditioning and $p = 15$ on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.24	6.2623e-12	0
MSQRTALS	49	19	20	143	0.62	1.3997e-10	0
MSQRTBLS	100	24	25	379	2.22	4.8675e-10	0
MSQRTBLS	49	17	18	161	0.59	2.0502e-10	0
MSQRTBLS	9	13	14	36	0.22	4.8784e-11	0
NCB20B	100	22	23	931	5.55	196.68	0
NCB20B	50	26	27	651	1.84	99.504	0
NCB20B	500	21	22	727	30.31	897.52	0
NONDIA	100	19	20	47	0.40	2.898e-15	0
NONDIA	50	19	20	48	0.34	6.6466e-13	0
NONDIA	500	18	19	42	0.88	2.4158e-10	0
NONDQUAR	100	15	16	37	0.32	2.2854e-09	0
NONDQUAR	500	16	17	36	0.73	3.9386e-09	0
NONMSQRT	100	10000	10001	2965593	8867.73	18.072	1
NONMSQRT	49	10000	10001	1328696	1620.42	1.0763	1
NONMSQRT	9	63	64	168	0.94	0.75193	0
OSBORNEA	5	40	41	92	0.65	5.4679e-05	0
OSBORNEB	11	19	20	78	0.54	0.040138	0
PALMER1C	8	20	21	174	0.39	0.097605	0
PALMER1D	7	14	15	56	0.25	0.65267	0
PALMER2C	8	19	20	200	0.36	0.014369	0
PALMER3C	8	11	12	78	0.20	0.019539	0
PALMER4C	8	24	25	215	0.44	0.050312	0
PENALTY1	10	40	41	171	0.58	7.0981e-05	0
PENALTY1	100	53	54	653	1.55	0.00090254	0
PENALTY1	50	47	48	477	1.00	0.00043182	0
PENALTY1	500	59	60	632	7.90	0.0047793	0
PENALTY2	10	71	72	247	1.11	0.00029385	0
PENALTY2	100	19	20	87	0.60	97096	0
PENALTY2	50	30	31	154	0.65	4.2961	0
PENALTY3	100	22	23	55	20.90	0.001	0
PENALTY3	50	21	22	56	4.15	0.001	0
PFIT1LS	3	211	212	389	3.03	6.3273e-07	0
POWELLSG	100	15	16	30	0.31	2.1902e-07	0
POWELLSG	500	15	16	30	0.65	1.1139e-06	0
POWELLSG	20	15	16	30	0.25	4.0054e-08	0
POWELLSG	4	15	16	30	0.24	4.2527e-09	0
POWER	10	16	17	40	0.26	1.1098e-08	0
POWER	100	22	23	66	0.49	5.0264e-09	0
POWER	50	19	20	54	0.35	2.3411e-08	0
POWER	500	26	27	78	2.48	5.9786e-09	0
QUARTC	100	26	27	47	0.51	4.5801e-07	0

Table 94: NMTR1 with band preconditioning and $p = 15$ on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.35	5.2022e-08	0
QUARTC	500	33	34	59	1.36	5.8379e-07	0
ROSENBR	2	26	27	45	0.39	3.2328e-13	0
S308	2	10	11	16	0.17	0.7732	0
SCHMVETT	10	3	4	6	0.06	-24	0
SCHMVETT	500	3	4	6	0.36	-1494	0
SCHMVETT	3	3	4	6	0.05	-3	0
SCHMVETT	500	3	4	6	0.36	-1494	0
SINQUAD	100	40	41	140	0.95	4.1555e-08	0
SINQUAD	5	11	12	22	0.18	1.1721e-08	0
SINQUAD	50	33	34	124	0.64	1.4352e-07	0
SINQUAD	500	51	52	158	3.08	1.9161e-08	0
SISSER	2	12	13	19	0.20	1.1139e-08	0
SNAIL	2	65	66	117	0.67	1.6803e-13	0
SPMSRTLS	100	14	15	26	0.38	3.2303e-13	0
SPMSRTLS	28	12	13	22	0.24	3.2953e-16	0
SPMSRTLS	499	20	21	39	1.55	1.9096e-16	0
SROSENBR	10	6	7	10	0.11	4.6748e-17	0
SROSENBR	100	6	7	10	0.15	4.6748e-16	0
SROSENBR	50	6	7	10	0.13	2.3374e-16	0
SROSENBR	500	10	11	20	0.49	2.9154e-13	0
TOINTGOR	50	9	10	84	0.22	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.08	10	0
TOINTGSS	50	2	3	4	0.05	10	0
TOINTGSS	500	2	3	4	0.23	10	0
TOINTPSP	50	23	24	88	0.44	225.56	0
TOINTQOR	50	6	7	30	0.14	1175.5	0
TQUARTIC	100	12	13	35	0.29	2.7682e-11	0
TQUARTIC	5	1	2	2	0.04	4.4373e-31	0
TQUARTIC	50	10	11	35	0.19	5.2793e-13	0
TQUARTIC	500	15	16	42	0.75	4.787e-15	0
TRIDIA	10	1	2	2	0.04	1.0805e-30	0
TRIDIA	100	2	3	3	0.09	1.352e-32	0
TRIDIA	50	2	3	3	0.07	1.352e-32	0
TRIDIA	500	2	3	3	0.26	1.3482e-32	0
VARDIM	10	14	15	14	0.21	1.595e-26	0
VARDIM	100	25	26	25	0.58	5.171e-26	0
VARDIM	50	22	23	22	0.39	1.2641e-27	0
VARDIM	500	33	34	33	5.02	1.1634e-25	0
VAREIGVL	10	36	37	156	0.54	7.2928e-12	0
VAREIGVL	100	12	13	84	0.38	3.3727e-09	0

Table 95: NMTR1 with band preconditioning and $p = 15$ on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.30	2.9295e-10	0
VAREIGVL	500	12	13	63	1.58	2.0175e-08	0
VIBRBEAM	8	31	32	104	0.70	0.15647	3
WATSON	12	8	9	44	0.22	7.76e-08	0
WATSON	31	10	11	57	0.36	5.0956e-08	0
WOODS	100	15	16	28	0.31	2.0135e-17	0
WOODS	4	15	16	28	0.23	8.0539e-19	0
WOODS	500	16	17	31	0.71	9.8289e-15	0
YFITU	3	37	38	73	0.54	1.9632e-08	0
ZANGWIL2	2	1	2	1	0.02	-18.2	0
PFIT2LS	3	52	53	86	0.75	2.9525e-11	0
PFIT3LS	3	39	40	65	0.58	4.0587e-11	0
PFIT4LS	3	68	69	111	0.95	7.824e-13	0
EXTROSNB	10	297	298	615	4.25	1.15e-08	0
EXTROSNB	50	432	433	863	6.95	2.1896e-07	0
EXTROSNB	100	432	433	863	7.77	1.3237e-07	0

Table 96: NMTR1 with band preconditioning and $p = 15$ on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.70	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.05	1.11e-12	0
BDQRTIC	1000	11	12	24	1.58	3983.8	0
BROYDN7D	1000	63	64	151	5.27	345.54	0
BRYBND	1000	16	17	46	2.51	1.8775e-12	0
BRYBND	5000	24	25	74	18.60	2.3487e-13	0
CRAGGLVY	1000	14	15	25	1.49	336.42	0
CRAGGLVY	5000	14	15	26	7.42	1688.2	0
DIXMAANA	1500	5	6	15	0.92	1	0
DIXMAANA	3000	5	6	15	1.84	1	0
DIXMAANB	1500	7	8	14	1.07	1	0
DIXMAANB	3000	7	8	14	2.12	1	0
DIXMAANC	1500	17	18	28	1.99	1	0
DIXMAANC	3000	14	15	27	3.58	1	0
DIXMAAND	1500	9	10	21	1.26	1	0
DIXMAAND	3000	11	12	24	2.83	1	0
DIXMAANE	1500	6	7	17	1.02	1	0
DIXMAANE	3000	6	7	17	2.03	1	0
DIXMAANF	1500	25	26	46	2.78	1	0
DIXMAANF	3000	45	46	83	8.52	1	0
DIXMAANG	1500	38	39	78	3.90	1	0
DIXMAANG	3000	49	50	91	9.21	1	0
DIXMAANH	1500	49	50	99	4.83	1	0
DIXMAANH	3000	61	62	120	11.74	1	0
DIXMAANI	1500	7	8	23	1.13	1	0
DIXMAANI	3000	7	8	29	2.40	1	0
DIXMAANJ	1500	65	66	153	6.20	1	0
DIXMAANJ	3000	35	36	86	7.22	1	0
DIXMAANK	1500	62	63	125	5.76	1	0
DIXMAANK	3000	32	33	69	6.40	1	0
DIXMAANL	1500	61	62	266	7.32	1	0
DIXMAANL	3000	57	58	122	10.90	1	0
DQDRTIC	1000	2	3	2	0.39	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.79	1.6602e-23	0
DQRTIC	1000	35	36	62	2.37	3.6952e-06	0
DQRTIC	5000	42	43	73	12.91	7.0042e-06	0
EDENSCH	2000	12	13	21	2.42	12003	0
EIGENALS	930	43	44	160	80.38	2.5686e-11	0
EIGENBLS	930	435	436	13064	2300.74	1.9059e-07	0
ENGVAL1	1000	7	8	14	0.81	1108.2	0
ENGVAL1	5000	7	8	14	3.82	5548.7	0
FLETCBV2	1000	0	1	0	0.31	-0.50134	0

Table 97: NMTR1 with band preconditioning and $p = 15$ on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1029.96	-1.8877e+06	1
FMINSURF	1024	407	408	911	135.95	1	0
FMINSURF	5625	244	245	803	1904.62	1	0
FREUROTH	1000	10	11	17	1.05	121470	0
FREUROTH	5000	10	11	17	5.02	608160	0
LIARWHD	1000	14	15	35	1.25	2.0274e-20	0
LIARWHD	5000	13	14	28	5.59	6.0958e-16	0
MOREBV	1000	1	2	2	0.37	7.3289e-13	0
MOREBV	5000	1	2	2	1.76	5.8478e-15	0
MSQRTALS	1024	45	46	6306	898.39	1.9394e-08	0
MSQRTALS	529	21	22	1985	89.17	4.0963e-08	0
MSQRTBLS	529	35	36	4165	178.55	2.6906e-08	0
MSQRTBLS	1024	24	25	2024	315.99	4.5054e-09	0
NCB20B	1000	22	23	590	50.71	1676	0
NONDIA	1000	23	24	58	1.75	4.1197e-12	0
NONDIA	5000	32	33	80	10.89	5.0265e-15	0
NONDIA	10000	33	34	81	22.60	1.2547e-07	0
NONDQUAR	1000	17	18	36	1.20	1.3932e-09	0
NONDQUAR	5000	18	19	37	5.75	1.0076e-09	0
NONDQUAR	10000	19	20	38	12.06	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	58	59	577	22.44	0.0096875	0
POWELLSG	1000	15	16	30	1.04	2.2324e-06	0
POWELLSG	5000	15	16	32	4.76	5.2976e-06	0
POWELLSG	10000	15	16	32	9.68	1.0595e-05	0
POWER	1000	27	28	80	7.53	1.8888e-08	0
QUARTC	1000	35	36	62	2.38	3.6952e-06	0
QUARTC	5000	42	43	73	12.97	7.0042e-06	0
QUARTC	10000	45	46	78	27.46	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.69	-2994	0
SCHMVETT	5000	3	4	6	3.38	-14994	0
SCHMVETT	10000	3	4	6	6.75	-29994	0
SINQUAD	1000	55	56	170	6.26	1.5526e-08	0
SINQUAD	5000	125	126	392	98.18	2.7468e-08	0
SINQUAD	10000	116	117	348	202.96	5.1229e-06	0
SPMSRTLS	1000	25	26	53	3.35	5.6048e-16	0
SPMSRTLS	4999	27	28	55	17.80	3.0578e-11	0
SPMSRTLS	10000	40	41	88	50.63	2.9321e-14	0
SROSENBR	1000	10	11	20	0.80	5.8309e-13	0
SROSENBR	5000	10	11	20	3.71	2.9154e-12	0
SROSENBR	10000	10	11	20	7.48	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.56	7.6524e-11	0

Table 98: NMTR1 with band preconditioning and $p = 15$ on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.43	10	0
TOINTGSS	5000	2	3	4	1.99	10	0
TOINTGSS	10000	2	3	4	4.00	10	0
TQUARTIC	1000	12	13	36	1.16	2.9487e-11	0
TQUARTIC	5000	20	21	51	10.03	1.1107e-10	0
TQUARTIC	10000	18	19	44	23.09	3.5718e-15	0
TRIDIA	1000	2	3	3	0.47	1.3827e-32	0
TRIDIA	5000	2	3	3	2.16	4.1976e-33	0
TRIDIA	10000	2	3	3	4.32	5.3451e-33	0
VARDIM	1000	36	37	36	18.79	1.1203e-20	0
VARDIM	5000	45	46	45	545.88	1.1459e-18	0
VAREIGVL	1000	12	13	70	4.45	5.6139e-08	0
VAREIGVL	5000	13	14	59	83.41	7.7013e-08	0
WOODS	1000	16	17	31	1.22	1.9658e-14	0
WOODS	10000	16	17	31	11.86	1.9658e-13	0
FLETCHCR	1000	1321	1322	2642	79.99	1.5315e-20	0
GENROSE	1000	564	565	1225	32.18	1	0

Table 99: NMTR1 with band preconditioning and $p = 15$ on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	77	78	3267	19.17	0	0
CATENARY	501	845	846	15095	83.38	-348400	0
CHANDHEQ	100	13	14	62	6.80	6.7959e-08	0
CHEMRCTA	100	36	37	608	1.27	5.102e-15	0
CHEMRCTB	1000	52	53	165	6.25	6.1367e-20	0
CLPLATEC	5041	3	4	3935	199.06	-0.0050207	0
CORKSCRW	456	129	130	76738	224.66	26.484	0
DALLASM	196	82	83	15783	25.36	-48198	0
DISCS	36	290	291	7748	15.06	12	0
DRUGDIS	304	211	212	3821	19.29	4.2452	0
DTOC5	9999	25	26	91	44.57	1.5316	0
EXPFITB	5	62	63	902	2.57	0.0050193	0
EXPFITC	5	84	85	1696	13.59	0.023303	0
FCCU	19	16	17	57	0.35	11.149	0
FLETCHER	4	31	32	64	0.49	19.525	0
GILBERT	500	29	30	71	3.41	237.37	0
GRIDNETA	3444	35	36	3753	89.44	161.61	0
GRIDNETE	3444	27	28	2939	105.25	144.06	0
HADAMARD	257	304	305	22628	287.18	1	0
HAGER3	2001	12	13	32	4.02	0.14096	0
HAGER4	2001	11	12	2294	46.06	2.7942	0
HS114	10	751	752	4450	11.96	-1768.8	0
HS59	2	251	252	496	3.62	-7.8028	0
HS75	4	136	137	546	2.04	5174.4	0
HVYCRASH	204	248	249	1883	9.43	-0.2185	0
HYDROELL	1009	143	144	22557	259.13	-3.5855e+06	0
JUNKTURN	5010	69	70	1023	85.59	9.4151e-06	0
KSIP	20	69	70	3794	67.70	0.57579	0
LINVERSE	1999	25	26	963	43.84	681	0
LMINSURF	1024	327	328	863	31.31	9	0
MANNE	300	6	7	75	0.94	-0.97457	0
MEYER3	3	163	164	401	2.39	87.946	0
MINPERM	51	18	19	141	0.50	0.0384	0
MISTAKE	9	32	33	215	0.60	-1	0
NGONE	50	1134	1135	31185	163.27	-0.64103	0
NLMSURF	1024	955	956	2637	92.21	38.591	0
NYSTROM5	18	28	29	453	0.64	2.4426e-05	0
ODC	10404	19	20	916	144.04	-0.0040122	0
OET1	3	38	39	974	13.32	0.53824	0
OPTCTRL3	122	61	62	249	1.68	2048	0
ORTHREGA	2053	175	176	889	60.58	5661.4	0
ORTHREGC	5005	57	58	415	64.98	94.813	0

Table 100: NMTR1 with band preconditioning and $p = 15$ on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	537	538	2553	13.68	15.59	0
ORTHREGF	1205	173	174	413	20.58	22.553	0
PRODPL1	60	67	68	1167	1.74	35.739	0
QR3D	610	123	124	13934	398.47	1.1139e-08	0
QR3DBD	457	122	123	1770	51.62	2.1558e-10	0
READING1	202	707	708	15548	48.14	-0.16049	0
SEMICON1	102	572	573	1142	18.56	6.8366e-16	0
SEMICON2	1002	134	135	261	29.11	1.6734e-06	0
SIPOW1	2	40	41	1239	31.70	-1	0
SPANHYD	97	25	26	477	1.00	239.74	0
SSC	10404	1	2	93	28.36	-2.0782	0
SSEBNLN	194	65	66	1514	3.36	1.6171e+07	0
SSNLBEAM	3003	239	240	7246	274.86	340.03	0
STEENBRE	540	737	738	42010	85.97	27459	0
TENBARS1	18	417	418	5231	7.86	2295.4	0
TENBARS2	18	253	254	2020	4.37	2277.9	0
TRAINF	408	43	44	1275	5.33	3.0975	0
TRUSPYR1	11	546	547	2515	8.77	11.229	0
UBH5	1010	80	81	22512	141.82	1.1163	0
WATER	31	37	38	346	0.74	10549	0
ZIGZAG	304	89	90	17835	44.22	33.787	0

Table 101: NMTR1 with band preconditioning and $p = 15$ on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.14	5.7444	0
ARWHEAD	100	5	6	7	0.14	0	0
ARWHEAD	500	5	6	6	0.37	1.3237e-09	0
BARD	3	7	8	13	0.12	0.0082149	0
BDQRTIC	100	11	12	23	0.29	378.77	0
BDQRTIC	500	11	12	24	0.82	1981	0
BEALE	2	7	8	14	0.12	2.9425e-14	0
BIGGS6	6	71	72	154	1.05	2.0041e-10	0
BOX3	3	7	8	13	0.11	1.9221e-11	0
BRKMCC	2	3	4	5	0.06	0.16904	0
BROWNAL	10	5	6	42	0.11	9.2726e-11	0
BROWNBS	2	34	35	50	0.49	0	0
BROWNDEN	4	11	12	20	0.18	85822	0
BROYDN7D	10	16	17	32	0.25	1.2611	0
BROYDN7D	100	30	31	65	0.64	29.362	0
BROYDN7D	500	48	49	109	2.32	169.56	0
BRYBND	10	11	12	36	0.18	7.2241e-15	0
BRYBND	100	12	13	38	0.37	1.3572e-12	0
BRYBND	500	15	16	43	1.26	1.7435e-13	0
CHNROSNB	10	25	26	50	0.38	4.308e-21	0
CLIFF	2	27	28	30	0.40	0.19979	0
CRAGGLVY	100	14	15	25	0.35	32.27	0
CRAGGLVY	4	16	17	30	0.25	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.84	167.45	0
CUBE	2	32	33	59	0.46	7.6271e-15	0
DENSCHNA	2	5	6	9	0.10	1.2e-15	0
DENSCHNB	2	3	4	5	0.06	0	0
DENSCHNC	2	9	10	13	0.15	1.8423e-13	0
DENSCHND	3	33	34	63	0.46	8.6576e-09	0
DENSCHNE	3	11	12	16	0.17	2.4642e-12	0
DENSCHNF	2	6	7	12	0.11	6.5139e-22	0
DIXMAANA	15	5	6	9	0.08	1	0
DIXMAANA	90	5	6	14	0.11	1	0
DIXMAANA	300	5	6	14	0.23	1	0
DIXMAANB	15	6	7	11	0.08	1	0
DIXMAANB	90	8	9	18	0.17	1	0
DIXMAANB	300	7	8	13	0.27	1	0
DIXMAANC	15	9	10	15	0.11	1	0
DIXMAANC	90	9	10	16	0.17	1	0
DIXMAANC	300	11	12	20	0.38	1	0
DIXMAAND	15	9	10	16	0.11	1	0
DIXMAAND	90	10	11	21	0.18	1	0

Table 102: NMTR1 with band preconditioning and $p = 20$ on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.38	1	0
DIXMAANE	15	6	7	12	0.08	1	0
DIXMAANE	90	6	7	16	0.12	1	0
DIXMAANE	300	6	7	16	0.26	1	0
DIXMAANF	15	10	11	20	0.12	1	0
DIXMAANF	90	10	11	21	0.18	1	0
DIXMAANF	300	41	42	87	1.09	1	0
DIXMAANG	15	11	12	22	0.12	1	0
DIXMAANG	90	16	17	33	0.26	1	0
DIXMAANG	300	24	25	47	0.72	1	0
DIXMAANH	15	13	14	26	0.14	1	0
DIXMAANH	90	19	20	40	0.31	1	0
DIXMAANH	300	26	27	49	0.76	1	0
DIXMAANI	15	5	6	11	0.07	1	0
DIXMAANI	90	6	7	15	0.13	1	0
DIXMAANI	300	6	7	15	0.25	1	0
DIXMAANJ	15	12	13	24	0.13	1	0
DIXMAANJ	90	20	21	42	0.30	1	0
DIXMAANJ	300	21	22	43	0.66	1	0
DIXMAANK	15	16	17	32	0.17	1	0
DIXMAANK	90	18	19	37	0.28	1	0
DIXMAANK	300	37	38	75	1.00	1	0
DIXMAANL	15	15	16	29	0.16	1	0
DIXMAANL	90	32	33	66	0.46	1	0
DIXMAANL	300	51	52	102	1.31	1	0
DIXON3DQ	10	2	3	4	0.05	0	0
DJTL	2	135	136	185	1.81	-8951.5	0
DQDRTIC	10	2	3	2	0.06	1.6602e-23	0
DQDRTIC	100	2	3	2	0.08	1.6602e-23	0
DQDRTIC	500	2	3	2	0.22	1.6602e-23	0
DQRTIC	100	26	27	47	0.51	4.5801e-07	0
DQRTIC	500	33	34	59	1.33	5.8379e-07	0
EDENSCH	36	12	13	21	0.22	219.28	0
EIGENALS	110	20	21	70	0.99	1.022e-10	0
EIGENALS	420	35	36	120	14.93	1.7732e-11	0
EIGENBLS	110	76	77	1127	8.08	2.825e-09	0
EIGENBLS	420	184	185	6510	293.76	2.4527e-08	0
EIGENCLS	462	266	267	3145	258.74	3.7978e-10	0
ENGVAL1	100	7	8	14	0.18	109.09	0
ENGVAL1	2	7	8	12	0.11	0	0
ERRINROS	10	46	47	85	0.66	6.6946	0
ERRINROS	50	50	51	97	0.84	39.904	0

Table 103: NMTR1 with band preconditioning and $p = 20$ on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.20	0.24051	0
EXTROSNB	5	34	35	67	0.51	1.0288e-12	0
FLETCBV2	100	1	2	2	0.07	-0.51401	0
FLETCBV3	100	10000	10001	20356	215.04	-1656.3	1
FLETCHBV	10	320	321	592	4.38	-2.0742e+06	0
FLETCHBV	100	10000	10001	16863	172.38	-1.4795e+11	1
FLETCHCR	10	26	27	52	0.38	2.0952e-18	0
FLETCHCR	100	144	145	288	2.68	1.1673e-17	0
FMINSURF	121	73	74	222	2.12	1	0
FMINSURF	16	17	18	35	0.28	1	0
FREUROTH	100	10	11	17	0.24	11965	0
FREUROTH	2	9	10	14	0.15	48.984	0
FREUROTH	50	10	11	17	0.20	5881	0
FREUROTH	500	10	11	17	0.58	60634	0
GENROSE	10	30	31	58	0.44	1	0
GENROSE	100	69	70	154	1.31	1	0
GENROSE	500	288	289	622	10.19	1	0
GROWTHLS	3	74	75	123	1.06	1.004	0
GULF	3	31	32	59	0.64	2.5375e-14	0
HAIRY	2	82	83	132	0.72	20	0
HATFLDD	3	19	20	37	0.30	6.6151e-08	0
HATFLDE	3	22	23	43	0.33	5.1204e-07	0
HEART6LS	6	912	913	1817	13.20	5.2821e-11	0
HELIX	3	12	13	23	0.18	2.9584e-13	0
HILBERTA	2	2	3	2	0.04	6.656e-31	0
HILBERTB	5	2	3	2	0.04	1.5953e-29	0
HIMMELBB	2	12	13	15	0.18	2.0444e-23	0
HIMMELBF	4	42	43	133	0.61	318.57	0
HIMMELBG	2	8	9	11	0.09	5.1108e-17	0
HIMMELBH	2	1	2	1	0.03	-1	0
HYDC20LS	99	10000	10001	1114971	2621.34	0.061765	1
JENSMP	2	9	10	14	0.16	124.36	0
KOWOSB	4	10	11	20	0.16	0.0003078	0
LIARWHD	100	13	14	37	0.30	9.0888e-21	0
LIARWHD	36	10	11	32	0.19	1.1625e-16	0
LIARWHD	500	15	16	36	0.78	3.7352e-14	0
LOGROS	2	38	39	54	0.52	6.0976e-12	0
MANCINO	100	15	16	23	17.56	9.2449e-18	0
MOREBV	10	2	3	4	0.05	6.582e-14	0
MOREBV	100	1	2	2	0.06	7.887e-10	0
MOREBV	500	1	2	2	0.21	5.9316e-12	0
MSQRTALS	100	17	18	245	1.52	5.5682e-10	0

Table 104: NMTR1 with band preconditioning and $p = 20$ on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.24	6.2623e-12	0
MSQRTALS	49	19	20	143	0.60	1.3997e-10	0
MSQRTBLS	100	24	25	379	2.16	4.8675e-10	0
MSQRTBLS	49	17	18	161	0.58	2.0502e-10	0
MSQRTBLS	9	13	14	36	0.21	4.8784e-11	0
NCB20B	100	22	23	931	5.52	196.68	0
NCB20B	50	26	27	651	1.80	99.504	0
NCB20B	500	21	22	727	30.22	897.52	0
NONDIA	100	19	20	47	0.39	2.898e-15	0
NONDIA	50	19	20	48	0.32	6.6466e-13	0
NONDIA	500	18	19	42	0.86	2.4158e-10	0
NONDQUAR	100	15	16	37	0.32	2.2854e-09	0
NONDQUAR	500	16	17	36	0.70	3.9386e-09	0
NONMSQRT	100	10000	10001	2965593	8717.90	18.072	1
NONMSQRT	49	10000	10001	1328696	1591.39	1.0763	1
NONMSQRT	9	63	64	168	0.90	0.75193	0
OSBORNEA	5	40	41	92	0.63	5.4679e-05	0
OSBORNEB	11	19	20	78	0.53	0.040138	0
PALMER1C	8	20	21	174	0.36	0.097605	0
PALMER1D	7	14	15	56	0.25	0.65267	0
PALMER2C	8	19	20	200	0.33	0.014369	0
PALMER3C	8	11	12	78	0.20	0.019539	0
PALMER4C	8	24	25	215	0.43	0.050312	0
PENALTY1	10	43	44	187	0.60	7.098e-05	0
PENALTY1	100	53	54	653	1.52	0.00090254	0
PENALTY1	50	50	51	491	1.00	0.0004318	0
PENALTY1	500	59	60	632	7.85	0.0047793	0
PENALTY2	10	71	72	247	1.10	0.00029385	0
PENALTY2	100	19	20	87	0.57	97096	0
PENALTY2	50	30	31	154	0.64	4.2961	0
PENALTY3	100	22	23	55	20.90	0.001	0
PENALTY3	50	21	22	56	4.12	0.001	0
PFIT1LS	3	218	219	441	3.08	7.378e-07	0
POWELLSG	100	15	16	30	0.31	2.1902e-07	0
POWELLSG	500	15	16	30	0.64	1.1139e-06	0
POWELLSG	20	15	16	30	0.24	4.0054e-08	0
POWELLSG	4	15	16	30	0.22	4.2527e-09	0
POWER	10	16	17	40	0.25	1.1098e-08	0
POWER	100	22	23	66	0.49	5.0264e-09	0
POWER	50	19	20	54	0.35	2.3411e-08	0
POWER	500	26	27	78	2.43	5.9786e-09	0
QUARTC	100	26	27	47	0.49	4.5801e-07	0

Table 105: NMTR1 with band preconditioning and $p = 20$ on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.33	5.2022e-08	0
QUARTC	500	33	34	59	1.32	5.8379e-07	0
ROSENBR	2	26	27	45	0.39	3.2328e-13	0
S308	2	10	11	16	0.16	0.7732	0
SCHMVETT	10	3	4	6	0.05	-24	0
SCHMVETT	500	3	4	6	0.36	-1494	0
SCHMVETT	3	3	4	6	0.04	-3	0
SCHMVETT	500	3	4	6	0.37	-1494	0
SINQUAD	100	40	41	140	0.96	4.1555e-08	0
SINQUAD	5	11	12	22	0.18	1.1721e-08	0
SINQUAD	50	33	34	124	0.65	1.4352e-07	0
SINQUAD	500	51	52	158	3.02	1.9161e-08	0
SISSER	2	12	13	19	0.19	1.1139e-08	0
SNAIL	2	65	66	117	0.63	1.6803e-13	0
SPMSRTLS	100	14	15	26	0.38	3.2303e-13	0
SPMSRTLS	28	12	13	22	0.21	3.2953e-16	0
SPMSRTLS	499	20	21	39	1.51	1.9096e-16	0
SROSENBR	10	6	7	10	0.11	4.6748e-17	0
SROSENBR	100	6	7	10	0.15	4.6748e-16	0
SROSENBR	50	6	7	10	0.13	2.3374e-16	0
SROSENBR	500	10	11	20	0.48	2.9154e-13	0
TOINTGOR	50	9	10	84	0.21	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.08	10	0
TOINTGSS	50	2	3	4	0.05	10	0
TOINTGSS	500	2	3	4	0.23	10	0
TOINTPSP	50	23	24	88	0.43	225.56	0
TOINTQOR	50	6	7	30	0.14	1175.5	0
TQUARTIC	100	12	13	35	0.27	2.7682e-11	0
TQUARTIC	5	1	2	2	0.04	4.4373e-31	0
TQUARTIC	50	10	11	35	0.19	5.2793e-13	0
TQUARTIC	500	15	16	42	0.76	4.787e-15	0
TRIDIA	10	1	2	2	0.04	1.0805e-30	0
TRIDIA	100	2	3	3	0.09	1.352e-32	0
TRIDIA	50	2	3	3	0.07	1.352e-32	0
TRIDIA	500	2	3	3	0.25	1.3482e-32	0
VARDIM	10	14	15	14	0.23	1.595e-26	0
VARDIM	100	25	26	25	0.59	5.171e-26	0
VARDIM	50	22	23	22	0.41	1.2641e-27	0
VARDIM	500	33	34	33	5.03	1.1634e-25	0
VAREIGVL	10	36	37	156	0.56	7.2928e-12	0
VAREIGVL	100	12	13	84	0.39	3.3727e-09	0

Table 106: NMTR1 with band preconditioning and $p = 20$ on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.29	2.9295e-10	0
VAREIGVL	500	12	13	63	1.59	2.0175e-08	0
VIBRBEAM	8	31	32	104	0.69	0.15647	3
WATSON	12	8	9	44	0.22	7.76e-08	0
WATSON	31	10	11	57	0.37	5.0956e-08	0
WOODS	100	15	16	28	0.32	2.0135e-17	0
WOODS	4	15	16	28	0.23	8.0539e-19	0
WOODS	500	16	17	31	0.73	9.8289e-15	0
YFITU	3	37	38	73	0.54	1.9632e-08	0
ZANGWIL2	2	1	2	1	0.03	-18.2	0
PFIT2LS	3	52	53	86	0.76	2.9525e-11	0
PFIT3LS	3	39	40	65	0.58	4.0587e-11	0
PFIT4LS	3	68	69	111	0.97	7.824e-13	0
EXTROSNB	10	267	268	576	3.87	2.0908e-08	0
EXTROSNB	50	401	402	801	6.48	2.1749e-07	0
EXTROSNB	100	389	390	777	7.01	1.8189e-07	0

Table 107: NMTR1 with band preconditioning and $p = 20$ on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.70	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.03	1.11e-12	0
BDQRTIC	1000	11	12	24	1.58	3983.8	0
BROYDN7D	1000	63	64	151	5.30	345.54	0
BRYBND	1000	16	17	46	2.51	1.8775e-12	0
BRYBND	5000	24	25	74	18.59	2.3487e-13	0
CRAGGLVY	1000	14	15	25	1.51	336.42	0
CRAGGLVY	5000	14	15	26	7.40	1688.2	0
DIXMAANA	1500	5	6	15	0.93	1	0
DIXMAANA	3000	5	6	15	1.83	1	0
DIXMAANB	1500	7	8	14	1.07	1	0
DIXMAANB	3000	7	8	14	2.12	1	0
DIXMAANC	1500	17	18	28	1.97	1	0
DIXMAANC	3000	14	15	27	3.57	1	0
DIXMAAND	1500	9	10	21	1.29	1	0
DIXMAAND	3000	11	12	24	2.87	1	0
DIXMAANE	1500	6	7	17	1.04	1	0
DIXMAANE	3000	6	7	17	2.05	1	0
DIXMAANF	1500	25	26	46	2.77	1	0
DIXMAANF	3000	45	46	83	8.56	1	0
DIXMAANG	1500	38	39	78	3.89	1	0
DIXMAANG	3000	49	50	91	9.23	1	0
DIXMAANH	1500	49	50	99	4.86	1	0
DIXMAANH	3000	68	69	133	12.88	1	0
DIXMAANI	1500	7	8	23	1.16	1	0
DIXMAANI	3000	7	8	29	2.42	1	0
DIXMAANJ	1500	82	83	180	7.48	1	0
DIXMAANJ	3000	35	36	86	7.22	1	0
DIXMAANK	1500	62	63	125	5.73	1	0
DIXMAANK	3000	32	33	69	6.41	1	0
DIXMAANL	1500	61	62	266	7.29	1	0
DIXMAANL	3000	57	58	122	10.91	1	0
DQDRTIC	1000	2	3	2	0.39	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.84	1.6602e-23	0
DQRTIC	1000	35	36	62	2.37	3.6952e-06	0
DQRTIC	5000	42	43	73	12.96	7.0042e-06	0
EDENSCH	2000	12	13	21	2.43	12003	0
EIGENALS	930	43	44	160	80.35	2.5686e-11	0
EIGENBLS	930	480	481	13355	2419.62	1.5934e-07	0
ENGVAL1	1000	7	8	14	0.81	1108.2	0
ENGVAL1	5000	7	8	14	3.85	5548.7	0
FLETCBV2	1000	0	1	0	0.32	-0.50134	0

Table 108: NMTR1 with band preconditioning and $p = 20$ on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1023.83	-1.8877e+06	1
FMINSURF	1024	330	331	767	110.45	1	0
FMINSURF	5625	204	205	702	1596.76	1	0
FREUROTH	1000	10	11	17	1.07	121470	0
FREUROTH	5000	10	11	17	5.07	608160	0
LIARWHD	1000	14	15	35	1.27	2.0274e-20	0
LIARWHD	5000	13	14	28	5.63	6.0958e-16	0
MOREBV	1000	1	2	2	0.38	7.3289e-13	0
MOREBV	5000	1	2	2	1.79	5.8478e-15	0
MSQRTALS	1024	37	38	4622	668.86	9.7882e-09	0
MSQRTALS	529	21	22	1985	89.07	4.0963e-08	0
MSQRTBLS	529	35	36	4165	178.57	2.6906e-08	0
MSQRTBLS	1024	24	25	2024	315.20	4.5054e-09	0
NCB20B	1000	22	23	590	50.68	1676	0
NONDIA	1000	23	24	58	1.76	4.1197e-12	0
NONDIA	5000	32	33	80	10.90	5.0265e-15	0
NONDIA	10000	33	34	81	22.69	1.2547e-07	0
NONDQUAR	1000	17	18	36	1.22	1.3932e-09	0
NONDQUAR	5000	18	19	37	5.78	1.0076e-09	0
NONDQUAR	10000	19	20	38	12.15	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	58	59	577	22.40	0.0096875	0
POWELLSG	1000	15	16	30	1.04	2.2324e-06	0
POWELLSG	5000	15	16	32	4.73	5.2976e-06	0
POWELLSG	10000	15	16	32	9.65	1.0595e-05	0
POWER	1000	27	28	80	7.49	1.8888e-08	0
QUARTC	1000	35	36	62	2.34	3.6952e-06	0
QUARTC	5000	42	43	73	12.87	7.0042e-06	0
QUARTC	10000	45	46	78	27.07	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.68	-2994	0
SCHMVETT	5000	3	4	6	3.37	-14994	0
SCHMVETT	10000	3	4	6	6.72	-29994	0
SINQUAD	1000	55	56	170	6.27	1.5526e-08	0
SINQUAD	5000	114	115	353	89.52	1.0964e-06	0
SINQUAD	10000	114	115	346	200.81	1.8183e-08	0
SPMSRTLS	1000	25	26	53	3.34	5.6048e-16	0
SPMSRTLS	4999	27	28	55	17.72	3.0578e-11	0
SPMSRTLS	10000	40	41	88	50.60	2.9321e-14	0
SROSENBR	1000	10	11	20	0.81	5.8309e-13	0
SROSENBR	5000	10	11	20	3.71	2.9154e-12	0
SROSENBR	10000	10	11	20	7.45	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.56	7.6524e-11	0

Table 109: NMTR1 with band preconditioning and $p = 20$ on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.42	10	0
TOINTGSS	5000	2	3	4	2.01	10	0
TOINTGSS	10000	2	3	4	4.00	10	0
TQUARTIC	1000	12	13	36	1.15	2.9487e-11	0
TQUARTIC	5000	20	21	51	10.00	1.1107e-10	0
TQUARTIC	10000	18	19	44	23.09	3.5718e-15	0
TRIDIA	1000	2	3	3	0.47	1.3827e-32	0
TRIDIA	5000	2	3	3	2.16	4.1976e-33	0
TRIDIA	10000	2	3	3	4.32	5.3451e-33	0
VARDIM	1000	36	37	36	18.75	1.1203e-20	0
VARDIM	5000	45	46	45	550.16	1.1459e-18	0
VAREIGVL	1000	12	13	70	4.47	5.6139e-08	0
VAREIGVL	5000	13	14	59	83.78	7.7013e-08	0
WOODS	1000	16	17	31	1.23	1.9658e-14	0
WOODS	10000	16	17	31	11.97	1.9658e-13	0
FLETCHCR	1000	1321	1322	2642	79.77	1.5315e-20	0
GENROSE	1000	555	556	1216	31.83	1	0

Table 110: NMTR1 with band preconditioning and $p = 20$ on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	77	78	3267	19.13	0	0
CATENARY	501	782	783	14615	79.14	-348400	0
CHANDHEQ	100	13	14	62	6.82	6.7959e-08	0
CHEMRCTA	100	36	37	608	1.25	5.102e-15	0
CHEMRCTB	1000	52	53	165	6.20	6.1367e-20	0
CLPLATEC	5041	3	4	3935	199.08	-0.0050207	0
CORKSCRW	456	129	130	76738	224.39	26.484	0
DALLASM	196	82	83	15783	25.17	-48198	0
DISCS	36	266	267	7404	14.06	12	0
DRUGDIS	304	211	212	3821	19.25	4.2452	0
DTOC5	9999	25	26	91	45.42	1.5316	0
EXPFITB	5	62	63	902	2.50	0.0050193	0
EXPFITC	5	84	85	1696	13.61	0.023303	0
FCCU	19	16	17	57	0.33	11.149	0
FLETCHER	4	31	32	64	0.50	19.525	0
GILBERT	500	29	30	71	3.41	237.37	0
GRIDNETA	3444	35	36	3753	89.40	161.61	0
GRIDNETE	3444	27	28	2939	105.54	144.06	0
HADAMARD	257	304	305	22628	285.86	1	0
HAGER3	2001	12	13	32	4.08	0.14096	0
HAGER4	2001	11	12	2294	46.13	2.7942	0
HS114	10	756	757	4517	11.42	-1768.8	0
HS59	2	246	247	489	3.59	-7.8028	0
HS75	4	136	137	546	2.03	5174.4	0
HVYCRASH	204	248	249	1881	9.52	-0.2185	0
HYDROELL	1009	143	144	22557	256.88	-3.5855e+06	0
JUNKTURN	5010	74	75	1155	94.52	9.3846e-06	0
KSIP	20	69	70	3794	67.22	0.57579	0
LINVERSE	1999	25	26	963	44.02	681	0
LMINSURF	1024	326	327	913	32.14	9	0
MANNE	300	6	7	75	0.96	-0.97457	0
MEYER3	3	161	162	396	2.51	87.946	0
MINPERM	51	18	19	141	0.53	0.0384	0
MISTAKE	9	32	33	215	0.60	-1	0
NGONE	50	1134	1135	31185	161.65	-0.64103	0
NLMSURF	1024	1078	1079	3022	104.58	38.591	0
NYSTROM5	18	28	29	453	0.65	2.4426e-05	0
ODC	10404	19	20	916	143.40	-0.0040122	0
OET1	3	38	39	974	13.26	0.53824	0
OPTCTRL3	122	61	62	249	1.68	2048	0
ORTHREGA	2053	175	176	889	60.37	5661.4	0
ORTHREGC	5005	57	58	415	64.66	94.813	0

Table 111: NMTR1 with band preconditioning and $p = 20$ on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	424	425	2091	11.09	15.59	0
ORTHREGF	1205	184	185	439	21.88	21.398	0
PRODPL1	60	59	60	1350	1.68	35.739	0
QR3D	610	123	124	13934	397.29	1.1139e-08	0
QR3DBD	457	122	123	1770	51.53	2.1558e-10	0
READING1	202	782	783	17574	53.21	-0.16049	0
SEMICON1	102	558	559	1112	17.89	1.5792e-15	0
SEMICON2	1002	134	135	261	29.32	1.6734e-06	0
SIPOW1	2	40	41	1239	31.45	-1	0
SPANHYD	97	25	26	582	1.04	239.74	0
SSC	10404	1	2	93	28.16	-2.0782	0
SSEBNLN	194	63	64	1272	2.98	1.6171e+07	0
SSNLBEAM	3003	239	240	7246	274.06	340.03	0
STEENBRE	540	535	536	25015	52.78	27459	0
TENBARS1	18	573	574	6863	10.60	2295.4	0
TENBARS2	18	247	248	1954	4.25	2277.9	0
TRAINF	408	43	44	1275	5.36	3.0975	0
TRUSPYR1	11	493	494	2252	7.91	11.228	3
UBH5	1010	80	81	22512	140.84	1.1163	0
WATER	31	43	44	412	0.84	10549	0
ZIGZAG	304	89	90	17835	43.74	33.787	0

Table 112: NMTR1 with band preconditioning and $p = 20$ on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.14	5.7444	0
ARWHEAD	100	5	6	7	0.14	0	0
ARWHEAD	500	5	6	6	0.38	1.3237e-09	0
BARD	3	7	8	13	0.12	0.0082149	0
BDQRTIC	100	11	12	23	0.30	378.77	0
BDQRTIC	500	11	12	24	0.82	1981	0
BEALE	2	7	8	14	0.13	2.9425e-14	0
BIGGS6	6	71	72	154	1.06	2.0041e-10	0
BOX3	3	7	8	13	0.12	1.9221e-11	0
BRKMCC	2	3	4	5	0.06	0.16904	0
BROWNAL	10	5	6	42	0.10	9.2726e-11	0
BROWNBS	2	34	35	50	0.49	0	0
BROWNDEN	4	11	12	20	0.18	85822	0
BROYDN7D	10	16	17	32	0.24	1.2611	0
BROYDN7D	100	30	31	65	0.64	29.362	0
BROYDN7D	500	48	49	109	2.33	169.56	0
BRYBND	10	11	12	36	0.19	7.2241e-15	0
BRYBND	100	12	13	38	0.40	1.3572e-12	0
BRYBND	500	15	16	43	1.28	1.7435e-13	0
CHNROSNB	10	25	26	50	0.39	4.308e-21	0
CLIFF	2	27	28	30	0.41	0.19979	0
CRAGGLVY	100	14	15	25	0.34	32.27	0
CRAGGLVY	4	16	17	30	0.26	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.86	167.45	0
CUBE	2	32	33	59	0.44	7.6271e-15	0
DENSCHNA	2	5	6	9	0.09	1.2e-15	0
DENSCHNB	2	3	4	5	0.07	0	0
DENSCHNC	2	9	10	13	0.15	1.8423e-13	0
DENSCHND	3	33	34	63	0.51	8.6576e-09	0
DENSCHNE	3	11	12	16	0.17	2.4642e-12	0
DENSCHNF	2	6	7	12	0.11	6.5139e-22	0
DIXMAANA	15	5	6	9	0.07	1	0
DIXMAANA	90	5	6	14	0.12	1	0
DIXMAANA	300	5	6	14	0.24	1	0
DIXMAANB	15	6	7	11	0.09	1	0
DIXMAANB	90	8	9	18	0.16	1	0
DIXMAANB	300	7	8	13	0.27	1	0
DIXMAANC	15	9	10	15	0.11	1	0
DIXMAANC	90	9	10	16	0.17	1	0
DIXMAANC	300	11	12	20	0.40	1	0
DIXMAAND	15	9	10	16	0.11	1	0
DIXMAAND	90	10	11	21	0.18	1	0

Table 113: NMTR1 with band preconditioning and $p = 25$ on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.39	1	0
DIXMAANE	15	6	7	12	0.08	1	0
DIXMAANE	90	6	7	16	0.13	1	0
DIXMAANE	300	6	7	16	0.27	1	0
DIXMAANF	15	10	11	20	0.12	1	0
DIXMAANF	90	10	11	21	0.18	1	0
DIXMAANF	300	47	48	99	1.23	1	0
DIXMAANG	15	11	12	22	0.12	1	0
DIXMAANG	90	16	17	33	0.26	1	0
DIXMAANG	300	24	25	47	0.73	1	0
DIXMAANH	15	13	14	26	0.14	1	0
DIXMAANH	90	19	20	40	0.31	1	0
DIXMAANH	300	26	27	49	0.77	1	0
DIXMAANI	15	5	6	11	0.07	1	0
DIXMAANI	90	6	7	15	0.12	1	0
DIXMAANI	300	6	7	15	0.25	1	0
DIXMAANJ	15	12	13	24	0.15	1	0
DIXMAANJ	90	20	21	42	0.29	1	0
DIXMAANJ	300	21	22	43	0.66	1	0
DIXMAANK	15	16	17	32	0.18	1	0
DIXMAANK	90	18	19	37	0.29	1	0
DIXMAANK	300	37	38	75	1.02	1	0
DIXMAANL	15	15	16	29	0.16	1	0
DIXMAANL	90	32	33	66	0.49	1	0
DIXMAANL	300	52	53	103	1.34	1	0
DIXON3DQ	10	2	3	4	0.05	0	0
DJTL	2	135	136	185	1.90	-8951.5	0
DQDRTIC	10	2	3	2	0.05	1.6602e-23	0
DQDRTIC	100	2	3	2	0.08	1.6602e-23	0
DQDRTIC	500	2	3	2	0.22	1.6602e-23	0
DQRTIC	100	26	27	47	0.50	4.5801e-07	0
DQRTIC	500	33	34	59	1.34	5.8379e-07	0
EDENSCH	36	12	13	21	0.23	219.28	0
EIGENALS	110	20	21	70	1.03	1.022e-10	0
EIGENALS	420	35	36	120	14.93	1.7732e-11	0
EIGENBLS	110	71	72	998	7.39	3.1002e-09	0
EIGENBLS	420	156	157	5735	255.73	5.2922e-08	0
EIGENCLS	462	329	330	3843	318.23	1.4547e-09	0
ENGVAL1	100	7	8	14	0.19	109.09	0
ENGVAL1	2	7	8	12	0.12	0	0
ERRINROS	10	46	47	85	0.67	6.6946	0
ERRINROS	50	50	51	97	0.84	39.904	0

Table 114: NMTR1 with band preconditioning and $p = 25$ on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.20	0.24051	0
EXTROSNB	5	34	35	67	0.49	1.0288e-12	0
FLETCBV2	100	1	2	2	0.07	-0.51401	0
FLETCBV3	100	10000	10001	20356	222.76	-1656.3	1
FLETCHBV	10	320	321	592	4.49	-2.0742e+06	0
FLETCHBV	100	10000	10001	16863	177.53	-1.4795e+11	1
FLETCHCR	10	26	27	52	0.37	2.0952e-18	0
FLETCHCR	100	144	145	288	2.76	1.1673e-17	0
FMINSURF	121	77	78	210	2.20	1	0
FMINSURF	16	17	18	35	0.27	1	0
FREUROTH	100	10	11	17	0.24	11965	0
FREUROTH	2	9	10	14	0.15	48.984	0
FREUROTH	50	10	11	17	0.20	5881	0
FREUROTH	500	10	11	17	0.60	60634	0
GENROSE	10	30	31	58	0.44	1	0
GENROSE	100	68	69	155	1.30	1	0
GENROSE	500	288	289	629	10.33	1	0
GROWTHLS	3	70	71	117	1.02	1.004	0
GULF	3	31	32	59	0.65	2.5375e-14	0
HAIRY	2	62	63	101	0.58	20	0
HATFLDD	3	19	20	37	0.30	6.6151e-08	0
HATFLDE	3	22	23	43	0.35	5.1204e-07	0
HEART6LS	6	886	887	1781	12.83	5.5758e-10	0
HELIX	3	12	13	23	0.19	2.9584e-13	0
HILBERTA	2	2	3	2	0.04	6.656e-31	0
HILBERTB	5	2	3	2	0.04	1.5953e-29	0
HIMMELBB	2	12	13	15	0.19	2.0444e-23	0
HIMMELBF	4	45	46	147	0.68	318.57	0
HIMMELBG	2	8	9	11	0.09	5.1108e-17	0
HIMMELBH	2	1	2	1	0.03	-1	0
HYDC20LS	99	10000	10001	1132829	2712.27	0.064045	1
JENSMP	2	9	10	14	0.16	124.36	0
KOWOSB	4	10	11	20	0.16	0.0003078	0
LIARWHD	100	13	14	37	0.30	9.0888e-21	0
LIARWHD	36	10	11	32	0.20	1.1625e-16	0
LIARWHD	500	15	16	36	0.77	3.7352e-14	0
LOGROS	2	38	39	54	0.51	6.0976e-12	0
MANCINO	100	15	16	23	17.59	9.2449e-18	0
MOREBV	10	2	3	4	0.05	6.582e-14	0
MOREBV	100	1	2	2	0.07	7.887e-10	0
MOREBV	500	1	2	2	0.21	5.9316e-12	0
MSQRTALS	100	17	18	245	1.56	5.5682e-10	0

Table 115: NMTR1 with band preconditioning and $p = 25$ on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.23	6.2623e-12	0
MSQRTALS	49	19	20	143	0.63	1.3997e-10	0
MSQRTBLS	100	24	25	379	2.21	4.8675e-10	0
MSQRTBLS	49	17	18	161	0.60	2.0502e-10	0
MSQRTBLS	9	13	14	36	0.21	4.8784e-11	0
NCB20B	100	22	23	931	5.56	196.68	0
NCB20B	50	26	27	651	1.84	99.504	0
NCB20B	500	21	22	727	30.25	897.52	0
NONDIA	100	19	20	47	0.39	2.898e-15	0
NONDIA	50	19	20	48	0.34	6.6466e-13	0
NONDIA	500	18	19	42	0.86	2.4158e-10	0
NONDQUAR	100	15	16	37	0.32	2.2854e-09	0
NONDQUAR	500	16	17	36	0.70	3.9386e-09	0
NONMSQRT	100	10000	10001	2965593	8809.91	18.072	1
NONMSQRT	49	10000	10001	1328696	1610.54	1.0763	1
NONMSQRT	9	63	64	168	0.93	0.75193	0
OSBORNEA	5	40	41	92	0.65	5.4679e-05	0
OSBORNEB	11	19	20	78	0.53	0.040138	0
PALMER1C	8	20	21	174	0.39	0.097605	0
PALMER1D	7	14	15	56	0.26	0.65267	0
PALMER2C	8	19	20	200	0.34	0.014369	0
PALMER3C	8	11	12	78	0.21	0.019539	0
PALMER4C	8	24	25	215	0.44	0.050312	0
PENALTY1	10	43	44	187	0.65	7.098e-05	0
PENALTY1	100	53	54	653	1.52	0.00090254	0
PENALTY1	50	50	51	491	1.01	0.0004318	0
PENALTY1	500	59	60	632	7.87	0.0047793	0
PENALTY2	10	71	72	247	1.10	0.00029385	0
PENALTY2	100	19	20	87	0.58	97096	0
PENALTY2	50	30	31	154	0.68	4.2961	0
PENALTY3	100	22	23	55	20.87	0.001	0
PENALTY3	50	21	22	56	4.12	0.001	0
PFIT1LS	3	140	141	284	1.98	8.0435e-07	0
POWELLSG	100	15	16	30	0.32	2.1902e-07	0
POWELLSG	500	15	16	30	0.64	1.1139e-06	0
POWELLSG	20	15	16	30	0.25	4.0054e-08	0
POWELLSG	4	15	16	30	0.24	4.2527e-09	0
POWER	10	16	17	40	0.25	1.1098e-08	0
POWER	100	22	23	66	0.50	5.0264e-09	0
POWER	50	19	20	54	0.36	2.3411e-08	0
POWER	500	26	27	78	2.49	5.9786e-09	0
QUARTC	100	26	27	47	0.53	4.5801e-07	0

Table 116: NMTR1 with band preconditioning and $p = 25$ on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.34	5.2022e-08	0
QUARTC	500	33	34	59	1.38	5.8379e-07	0
ROSENBR	2	26	27	45	0.38	3.2328e-13	0
S308	2	10	11	16	0.16	0.7732	0
SCHMVETT	10	3	4	6	0.05	-24	0
SCHMVETT	500	3	4	6	0.37	-1494	0
SCHMVETT	3	3	4	6	0.05	-3	0
SCHMVETT	500	3	4	6	0.38	-1494	0
SINQUAD	100	40	41	140	0.94	4.1555e-08	0
SINQUAD	5	11	12	22	0.18	1.1721e-08	0
SINQUAD	50	33	34	124	0.62	1.4352e-07	0
SINQUAD	500	51	52	158	2.99	1.9161e-08	0
SISSER	2	12	13	19	0.18	1.1139e-08	0
SNAIL	2	65	66	117	0.63	1.6803e-13	0
SPMSRTLS	100	14	15	26	0.39	3.2303e-13	0
SPMSRTLS	28	12	13	22	0.21	3.2953e-16	0
SPMSRTLS	499	20	21	39	1.54	1.9096e-16	0
SROSENBR	10	6	7	10	0.11	4.6748e-17	0
SROSENBR	100	6	7	10	0.15	4.6748e-16	0
SROSENBR	50	6	7	10	0.13	2.3374e-16	0
SROSENBR	500	10	11	20	0.49	2.9154e-13	0
TOINTGOR	50	9	10	84	0.21	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.08	10	0
TOINTGSS	50	2	3	4	0.06	10	0
TOINTGSS	500	2	3	4	0.24	10	0
TOINTPSP	50	23	24	88	0.46	225.56	0
TOINTQOR	50	6	7	30	0.14	1175.5	0
TQUARTIC	100	12	13	35	0.27	2.7682e-11	0
TQUARTIC	5	1	2	2	0.04	4.4373e-31	0
TQUARTIC	50	10	11	35	0.19	5.2793e-13	0
TQUARTIC	500	15	16	42	0.77	4.787e-15	0
TRIDIA	10	1	2	2	0.04	1.0805e-30	0
TRIDIA	100	2	3	3	0.09	1.352e-32	0
TRIDIA	50	2	3	3	0.07	1.352e-32	0
TRIDIA	500	2	3	3	0.26	1.3482e-32	0
VARDIM	10	14	15	14	0.23	1.595e-26	0
VARDIM	100	25	26	25	0.60	5.171e-26	0
VARDIM	50	22	23	22	0.40	1.2641e-27	0
VARDIM	500	33	34	33	5.05	1.1634e-25	0
VAREIGVL	10	36	37	156	0.56	7.2928e-12	0
VAREIGVL	100	12	13	84	0.38	3.3727e-09	0

Table 117: NMTR1 with band preconditioning and $p = 25$ on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.30	2.9295e-10	0
VAREIGVL	500	12	13	63	1.59	2.0175e-08	0
VIBRBEAM	8	31	32	104	0.72	0.15647	3
WATSON	12	8	9	44	0.22	7.76e-08	0
WATSON	31	10	11	57	0.37	5.0956e-08	0
WOODS	100	15	16	28	0.32	2.0135e-17	0
WOODS	4	15	16	28	0.22	8.0539e-19	0
WOODS	500	16	17	31	0.73	9.8289e-15	0
YFITU	3	37	38	73	0.55	1.9632e-08	0
ZANGWIL2	2	1	2	1	0.03	-18.2	0
PFIT2LS	3	52	53	86	0.74	2.9525e-11	0
PFIT3LS	3	39	40	65	0.56	4.0587e-11	0
PFIT4LS	3	68	69	111	1.01	7.824e-13	0
EXTROSNB	10	290	291	596	4.20	1.3098e-08	0
EXTROSNB	50	369	370	737	5.94	2.8505e-07	0
EXTROSNB	100	421	422	841	7.62	1.7182e-07	0

Table 118: NMTR1 with band preconditioning and $p = 25$ on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.73	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.10	1.11e-12	0
BDQRTIC	1000	11	12	24	1.59	3983.8	0
BROYDN7D	1000	63	64	151	5.35	345.54	0
BRYBND	1000	16	17	46	2.52	1.8775e-12	0
BRYBND	5000	24	25	74	18.63	2.3487e-13	0
CRAGGLVY	1000	14	15	25	1.51	336.42	0
CRAGGLVY	5000	14	15	26	7.47	1688.2	0
DIXMAANA	1500	5	6	15	0.96	1	0
DIXMAANA	3000	5	6	15	1.89	1	0
DIXMAANB	1500	7	8	14	1.09	1	0
DIXMAANB	3000	7	8	14	2.16	1	0
DIXMAANC	1500	17	18	28	2.00	1	0
DIXMAANC	3000	14	15	27	3.61	1	0
DIXMAAND	1500	9	10	21	1.28	1	0
DIXMAAND	3000	11	12	24	2.87	1	0
DIXMAANE	1500	6	7	17	1.04	1	0
DIXMAANE	3000	6	7	17	2.02	1	0
DIXMAANF	1500	25	26	46	2.76	1	0
DIXMAANF	3000	43	44	81	8.21	1	0
DIXMAANG	1500	38	39	78	3.90	1	0
DIXMAANG	3000	56	57	105	10.33	1	0
DIXMAANH	1500	50	51	101	4.93	1	0
DIXMAANH	3000	69	70	136	12.98	1	0
DIXMAANI	1500	7	8	23	1.14	1	0
DIXMAANI	3000	7	8	29	2.41	1	0
DIXMAANJ	1500	77	78	171	7.04	1	0
DIXMAANJ	3000	35	36	86	7.20	1	0
DIXMAANK	1500	62	63	125	5.75	1	0
DIXMAANK	3000	32	33	69	6.42	1	0
DIXMAANL	1500	47	48	284	6.73	1	0
DIXMAANL	3000	57	58	122	10.93	1	0
DQDRTIC	1000	2	3	2	0.38	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.80	1.6602e-23	0
DQRTIC	1000	35	36	62	2.34	3.6952e-06	0
DQRTIC	5000	42	43	73	12.83	7.0042e-06	0
EDENSCH	2000	12	13	21	2.42	12003	0
EIGENALS	930	43	44	160	80.44	2.5686e-11	0
EIGENBLS	930	249	250	10974	1707.90	1.4372e-07	0
ENGVAL1	1000	7	8	14	0.80	1108.2	0
ENGVAL1	5000	7	8	14	3.81	5548.7	0
FLETCBV2	1000	0	1	0	0.32	-0.50134	0

Table 119: NMTR1 with band preconditioning and $p = 25$ on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1022.94	-1.8877e+06	1
FMINSURF	1024	262	263	713	88.85	1	0
FMINSURF	5625	303	304	853	2357.60	1	0
FREUROTH	1000	10	11	17	1.06	121470	0
FREUROTH	5000	10	11	17	5.05	608160	0
LIARWHD	1000	14	15	35	1.26	2.0274e-20	0
LIARWHD	5000	13	14	28	5.63	6.0958e-16	0
MOREBV	1000	1	2	2	0.37	7.3289e-13	0
MOREBV	5000	1	2	2	1.77	5.8478e-15	0
MSQRTALS	1024	37	38	4622	669.07	9.7882e-09	0
MSQRTALS	529	21	22	1985	89.15	4.0963e-08	0
MSQRTBLS	529	35	36	4165	178.50	2.6906e-08	0
MSQRTBLS	1024	24	25	2024	315.22	4.5054e-09	0
NCB20B	1000	22	23	590	50.77	1676	0
NONDIA	1000	23	24	58	1.76	4.1197e-12	0
NONDIA	5000	32	33	80	10.88	5.0265e-15	0
NONDIA	10000	33	34	81	22.65	1.2547e-07	0
NONDQUAR	1000	17	18	36	1.22	1.3932e-09	0
NONDQUAR	5000	18	19	37	5.77	1.0076e-09	0
NONDQUAR	10000	19	20	38	12.10	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	58	59	577	22.49	0.0096875	0
POWELLSG	1000	15	16	30	1.06	2.2324e-06	0
POWELLSG	5000	15	16	32	4.74	5.2976e-06	0
POWELLSG	10000	15	16	32	9.73	1.0595e-05	0
POWER	1000	27	28	80	7.52	1.8888e-08	0
QUARTC	1000	35	36	62	2.35	3.6952e-06	0
QUARTC	5000	42	43	73	12.88	7.0042e-06	0
QUARTC	10000	45	46	78	27.33	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.70	-2994	0
SCHMVETT	5000	3	4	6	3.41	-14994	0
SCHMVETT	10000	3	4	6	6.77	-29994	0
SINQUAD	1000	55	56	170	6.28	1.5526e-08	0
SINQUAD	5000	99	100	297	77.90	2.449e-08	0
SINQUAD	10000	116	117	360	205.30	2.912e-08	0
SPMSRTLS	1000	25	26	53	3.35	5.6048e-16	0
SPMSRTLS	4999	27	28	55	17.71	3.0578e-11	0
SPMSRTLS	10000	44	45	96	54.17	3.311e-13	0
SROSENBR	1000	10	11	20	0.82	5.8309e-13	0
SROSENBR	5000	10	11	20	3.74	2.9154e-12	0
SROSENBR	10000	10	11	20	7.52	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.56	7.6524e-11	0

Table 120: NMTR1 with band preconditioning and $p = 25$ on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.43	10	0
TOINTGSS	5000	2	3	4	2.00	10	0
TOINTGSS	10000	2	3	4	4.03	10	0
TQUARTIC	1000	12	13	36	1.18	2.9487e-11	0
TQUARTIC	5000	20	21	51	10.05	1.1107e-10	0
TQUARTIC	10000	18	19	44	23.24	3.5718e-15	0
TRIDIA	1000	2	3	3	0.48	1.3827e-32	0
TRIDIA	5000	2	3	3	2.18	4.1976e-33	0
TRIDIA	10000	2	3	3	4.35	5.3451e-33	0
VARDIM	1000	36	37	36	18.76	1.1203e-20	0
VARDIM	5000	45	46	45	546.40	1.1459e-18	0
VAREIGVL	1000	12	13	70	4.48	5.6139e-08	0
VAREIGVL	5000	13	14	59	83.51	7.7013e-08	0
WOODS	1000	16	17	31	1.23	1.9658e-14	0
WOODS	10000	16	17	31	11.91	1.9658e-13	0
FLETCHCR	1000	1321	1322	2642	80.57	1.5315e-20	0
GENROSE	1000	540	541	1192	31.22	1	0

Table 121: NMTR1 with band preconditioning and $p = 25$ on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	77	78	3267	19.12	0	0
CATENARY	501	728	729	14576	77.68	-348400	0
CHANDHEQ	100	13	14	62	6.82	6.7959e-08	0
CHEMRCTA	100	36	37	608	1.29	5.102e-15	0
CHEMRCTB	1000	52	53	165	6.24	6.1367e-20	0
CLPLATEC	5041	3	4	3935	199.18	-0.0050207	0
CORKSCRW	456	129	130	76738	222.89	26.484	0
DALLASM	196	82	83	15783	25.45	-48198	0
DISCS	36	150	151	4359	8.47	12	0
DRUGDIS	304	211	212	3821	19.34	4.2452	0
DTOC5	9999	25	26	91	44.67	1.5316	0
EXPFITB	5	62	63	902	2.58	0.0050193	0
EXPFITC	5	84	85	1696	13.61	0.023303	0
FCCU	19	16	17	57	0.33	11.149	0
FLETCHER	4	31	32	64	0.50	19.525	0
GILBERT	500	29	30	71	3.38	237.37	0
GRIDNETA	3444	35	36	3753	89.30	161.61	0
GRIDNETE	3444	27	28	2939	105.17	144.06	0
HADAMARD	257	304	305	22628	287.42	1	0
HAGER3	2001	12	13	32	4.02	0.14096	0
HAGER4	2001	11	12	2294	46.16	2.7942	0
HS114	10	738	739	4451	11.36	-1768.8	0
HS59	2	244	245	486	3.64	-7.8028	0
HS75	4	136	137	546	2.05	5174.4	0
HVYCRASH	204	228	229	2376	10.12	-0.2185	0
HYDROELL	1009	143	144	22557	255.57	-3.5855e+06	0
JUNKTURN	5010	75	76	1180	96.09	9.4284e-06	0
KSIP	20	69	70	3794	67.26	0.57579	0
LINVERSE	1999	25	26	963	43.78	681	0
LMINSURF	1024	335	336	925	32.54	9	0
MANNE	300	6	7	75	0.95	-0.97457	0
MEYER3	3	143	144	347	2.14	87.946	0
MINPERM	51	18	19	141	0.51	0.0384	0
MISTAKE	9	32	33	215	0.58	-1	0
NGONE	50	1134	1135	31185	162.30	-0.64103	0
NLMSURF	1024	1052	1053	3019	102.77	38.591	0
NYSTROM5	18	28	29	453	0.66	2.4426e-05	0
ODC	10404	19	20	916	143.28	-0.0040122	0
OET1	3	38	39	974	13.35	0.53824	0
OPTCTRL3	122	61	62	249	1.72	2048	0
ORTHREGA	2053	172	173	897	60.29	5661.4	0
ORTHREGC	5005	57	58	415	64.80	94.813	0

Table 122: NMTR1 with band preconditioning and $p = 25$ on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	249	250	1360	6.78	15.59	0
ORTHREGF	1205	172	173	409	20.58	19.493	0
PRODPL1	60	55	56	1176	1.56	35.739	0
QR3D	610	123	124	13934	397.96	1.1139e-08	0
QR3DBD	457	122	123	1770	51.66	2.1558e-10	0
READING1	202	798	799	17192	52.79	-0.16049	0
SEMICON1	102	553	554	1113	17.96	9.614e-16	0
SEMICON2	1002	134	135	261	29.01	1.6734e-06	0
SIPOW1	2	40	41	1239	31.60	-1	0
SPANHYD	97	44	45	1581	2.11	239.74	0
SSC	10404	1	2	93	28.13	-2.0782	0
SSEBNLN	194	61	62	1342	3.09	1.6171e+07	0
SSNLBEAM	3003	239	240	7246	274.27	340.03	0
STEENBRE	540	522	523	31075	63.89	27459	0
TENBARS1	18	325	326	4818	6.40	2295.4	0
TENBARS2	18	211	212	1629	3.72	2277.9	0
TRAINF	408	43	44	1275	5.38	3.0975	0
TRUSPYR1	11	473	474	2215	7.79	11.229	0
UBH5	1010	80	81	22512	140.58	1.1163	0
WATER	31	39	40	381	0.78	10549	0
ZIGZAG	304	89	90	17835	43.44	33.787	0

Table 123: NMTR1 with band preconditioning and $p = 25$ on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.14	5.7444	0
ARWHEAD	100	5	6	7	0.15	0	0
ARWHEAD	500	5	6	6	0.39	1.3237e-09	0
BARD	3	7	8	13	0.13	0.0082149	0
BDQRTIC	100	11	12	23	0.31	378.77	0
BDQRTIC	500	11	12	24	0.83	1981	0
BEALE	2	7	8	14	0.12	2.9425e-14	0
BIGGS6	6	88	89	190	1.30	5.6032e-09	0
BOX3	3	7	8	13	0.12	1.9221e-11	0
BRKMCC	2	3	4	5	0.06	0.16904	0
BROWNAL	10	5	6	42	0.11	9.2726e-11	0
BROWNBS	2	34	35	50	0.51	0	0
BROWNDEN	4	11	12	20	0.19	85822	0
BROYDN7D	10	16	17	32	0.25	1.2611	0
BROYDN7D	100	30	31	65	0.64	29.362	0
BROYDN7D	500	48	49	109	2.33	169.56	0
BRYBND	10	11	12	36	0.18	7.2241e-15	0
BRYBND	100	12	13	38	0.37	1.3572e-12	0
BRYBND	500	15	16	43	1.27	1.7435e-13	0
CHNROSNB	10	25	26	50	0.38	4.308e-21	0
CLIFF	2	27	28	30	0.39	0.19979	0
CRAGGLVY	100	14	15	25	0.35	32.27	0
CRAGGLVY	4	16	17	30	0.26	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.86	167.45	0
CUBE	2	32	33	59	0.46	7.6271e-15	0
DENSCHNA	2	5	6	9	0.09	1.2e-15	0
DENSCHNB	2	3	4	5	0.07	0	0
DENSCHNC	2	9	10	13	0.15	1.8423e-13	0
DENSCHND	3	33	34	63	0.50	8.6576e-09	0
DENSCHNE	3	11	12	16	0.18	2.4642e-12	0
DENSCHNF	2	6	7	12	0.11	6.5139e-22	0
DIXMAANA	15	5	6	9	0.07	1	0
DIXMAANA	90	5	6	14	0.11	1	0
DIXMAANA	300	5	6	14	0.23	1	0
DIXMAANB	15	6	7	11	0.08	1	0
DIXMAANB	90	8	9	18	0.15	1	0
DIXMAANB	300	7	8	13	0.27	1	0
DIXMAANC	15	9	10	15	0.11	1	0
DIXMAANC	90	9	10	16	0.17	1	0
DIXMAANC	300	11	12	20	0.38	1	0
DIXMAAND	15	9	10	16	0.10	1	0
DIXMAAND	90	10	11	21	0.18	1	0

Table 124: NMTR1 with band preconditioning and $p = 30$ on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.37	1	0
DIXMAANE	15	6	7	12	0.09	1	0
DIXMAANE	90	6	7	16	0.14	1	0
DIXMAANE	300	6	7	16	0.26	1	0
DIXMAANF	15	10	11	20	0.12	1	0
DIXMAANF	90	10	11	21	0.18	1	0
DIXMAANF	300	47	48	99	1.23	1	0
DIXMAANG	15	11	12	22	0.13	1	0
DIXMAANG	90	16	17	33	0.27	1	0
DIXMAANG	300	24	25	47	0.72	1	0
DIXMAANH	15	13	14	26	0.14	1	0
DIXMAANH	90	19	20	40	0.32	1	0
DIXMAANH	300	26	27	49	0.74	1	0
DIXMAANI	15	5	6	11	0.07	1	0
DIXMAANI	90	6	7	15	0.13	1	0
DIXMAANI	300	6	7	15	0.25	1	0
DIXMAANJ	15	12	13	24	0.13	1	0
DIXMAANJ	90	20	21	42	0.31	1	0
DIXMAANJ	300	21	22	43	0.64	1	0
DIXMAANK	15	16	17	32	0.17	1	0
DIXMAANK	90	18	19	37	0.29	1	0
DIXMAANK	300	37	38	75	1.01	1	0
DIXMAANL	15	15	16	29	0.16	1	0
DIXMAANL	90	32	33	66	0.47	1	0
DIXMAANL	300	51	52	102	1.31	1	0
DIXON3DQ	10	2	3	4	0.05	0	0
DJTL	2	135	136	185	1.88	-8951.5	0
DQDRTIC	10	2	3	2	0.05	1.6602e-23	0
DQDRTIC	100	2	3	2	0.08	1.6602e-23	0
DQDRTIC	500	2	3	2	0.22	1.6602e-23	0
DQRTIC	100	26	27	47	0.52	4.5801e-07	0
DQRTIC	500	33	34	59	1.32	5.8379e-07	0
EDENSCH	36	12	13	21	0.23	219.28	0
EIGENALS	110	20	21	70	1.03	1.022e-10	0
EIGENALS	420	35	36	120	14.97	1.7732e-11	0
EIGENBLS	110	90	91	1231	9.27	1.753e-09	0
EIGENBLS	420	161	162	6012	267.67	3.7883e-08	0
EIGENCLS	462	300	301	3325	283.63	8.8328e-10	0
ENGVAL1	100	7	8	14	0.20	109.09	0
ENGVAL1	2	7	8	12	0.12	0	0
ERRINROS	10	46	47	85	0.68	6.6946	0
ERRINROS	50	50	51	97	0.85	39.904	0

Table 125: NMTR1 with band preconditioning and $p = 30$ on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.20	0.24051	0
EXTROSNB	5	34	35	67	0.51	1.0288e-12	0
FLETCBV2	100	1	2	2	0.08	-0.51401	0
FLETCBV3	100	10000	10001	20356	215.78	-1656.3	1
FLETCHBV	10	320	321	592	4.35	-2.0742e+06	0
FLETCHBV	100	10000	10001	16863	171.84	-1.4795e+11	1
FLETCHCR	10	26	27	52	0.40	2.0952e-18	0
FLETCHCR	100	144	145	288	2.70	1.1673e-17	0
FMINSURF	121	82	83	225	2.34	1	0
FMINSURF	16	17	18	35	0.27	1	0
FREUROTH	100	10	11	17	0.24	11965	0
FREUROTH	2	9	10	14	0.14	48.984	0
FREUROTH	50	10	11	17	0.20	5881	0
FREUROTH	500	10	11	17	0.59	60634	0
GENROSE	10	30	31	58	0.45	1	0
GENROSE	100	68	69	155	1.30	1	0
GENROSE	500	276	277	609	9.94	1	0
GROWTHLS	3	70	71	117	1.01	1.004	0
GULF	3	31	32	59	0.65	2.5375e-14	0
HAIRY	2	63	64	101	0.58	20	0
HATFLDD	3	19	20	37	0.29	6.6151e-08	0
HATFLDE	3	22	23	43	0.33	5.1204e-07	0
HEART6LS	6	829	830	1675	11.97	4.2621e-10	0
HELIX	3	12	13	23	0.18	2.9584e-13	0
HILBERTA	2	2	3	2	0.03	6.656e-31	0
HILBERTB	5	2	3	2	0.04	1.5953e-29	0
HIMMELBB	2	12	13	15	0.18	2.0444e-23	0
HIMMELBF	4	45	46	147	0.68	318.57	0
HIMMELBG	2	8	9	11	0.09	5.1108e-17	0
HIMMELBH	2	1	2	1	0.03	-1	0
HYDC20LS	99	10000	10001	1132404	2684.14	0.061488	1
JENSMP	2	9	10	14	0.15	124.36	0
KOWOSB	4	10	11	20	0.16	0.0003078	0
LIARWHD	100	13	14	37	0.31	9.0888e-21	0
LIARWHD	36	10	11	32	0.19	1.1625e-16	0
LIARWHD	500	15	16	36	0.78	3.7352e-14	0
LOGROS	2	38	39	54	0.53	6.0976e-12	0
MANCINO	100	15	16	23	17.62	9.2449e-18	0
MOREBV	10	2	3	4	0.05	6.582e-14	0
MOREBV	100	1	2	2	0.07	7.887e-10	0
MOREBV	500	1	2	2	0.21	5.9316e-12	0
MSQRTALS	100	17	18	245	1.53	5.5682e-10	0

Table 126: NMTR1 with band preconditioning and $p = 30$ on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.23	6.2623e-12	0
MSQRTALS	49	19	20	143	0.61	1.3997e-10	0
MSQRTBLS	100	24	25	379	2.19	4.8675e-10	0
MSQRTBLS	49	17	18	161	0.59	2.0502e-10	0
MSQRTBLS	9	13	14	36	0.22	4.8784e-11	0
NCB20B	100	22	23	931	5.56	196.68	0
NCB20B	50	26	27	651	1.83	99.504	0
NCB20B	500	21	22	727	30.28	897.52	0
NONDIA	100	19	20	47	0.40	2.898e-15	0
NONDIA	50	19	20	48	0.33	6.6466e-13	0
NONDIA	500	18	19	42	0.86	2.4158e-10	0
NONDQUAR	100	15	16	37	0.33	2.2854e-09	0
NONDQUAR	500	16	17	36	0.71	3.9386e-09	0
NONMSQRT	100	10000	10001	2965593	8723.87	18.072	1
NONMSQRT	49	10000	10001	1334335	1615.60	1.0762	1
NONMSQRT	9	63	64	168	0.93	0.75193	0
OSBORNEA	5	40	41	92	0.66	5.4679e-05	0
OSBORNEB	11	19	20	78	0.54	0.040138	0
PALMER1C	8	20	21	174	0.37	0.097605	0
PALMER1D	7	14	15	56	0.25	0.65267	0
PALMER2C	8	19	20	200	0.34	0.014369	0
PALMER3C	8	11	12	78	0.20	0.019539	0
PALMER4C	8	24	25	215	0.43	0.050312	0
PENALTY1	10	43	44	187	0.61	7.098e-05	0
PENALTY1	100	53	54	653	1.51	0.00090254	0
PENALTY1	50	50	51	491	1.02	0.0004318	0
PENALTY1	500	59	60	632	7.85	0.0047793	0
PENALTY2	10	71	72	247	1.10	0.00029385	0
PENALTY2	100	19	20	87	0.58	97096	0
PENALTY2	50	30	31	154	0.64	4.2961	0
PENALTY3	100	22	23	55	20.91	0.001	0
PENALTY3	50	21	22	56	4.14	0.001	0
PFIT1LS	3	199	200	397	2.86	7.0463e-07	0
POWELLSG	100	15	16	30	0.32	2.1902e-07	0
POWELLSG	500	15	16	30	0.64	1.1139e-06	0
POWELLSG	20	15	16	30	0.24	4.0054e-08	0
POWELLSG	4	15	16	30	0.24	4.2527e-09	0
POWER	10	16	17	40	0.25	1.1098e-08	0
POWER	100	22	23	66	0.49	5.0264e-09	0
POWER	50	19	20	54	0.35	2.3411e-08	0
POWER	500	26	27	78	2.46	5.9786e-09	0
QUARTC	100	26	27	47	0.52	4.5801e-07	0

Table 127: NMTR1 with band preconditioning and $p = 30$ on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.34	5.2022e-08	0
QUARTC	500	33	34	59	1.32	5.8379e-07	0
ROSENBR	2	26	27	45	0.38	3.2328e-13	0
S308	2	10	11	16	0.16	0.7732	0
SCHMVETT	10	3	4	6	0.05	-24	0
SCHMVETT	500	3	4	6	0.36	-1494	0
SCHMVETT	3	3	4	6	0.05	-3	0
SCHMVETT	500	3	4	6	0.36	-1494	0
SINQUAD	100	40	41	140	0.95	4.1555e-08	0
SINQUAD	5	11	12	22	0.18	1.1721e-08	0
SINQUAD	50	33	34	124	0.63	1.4352e-07	0
SINQUAD	500	51	52	158	3.03	1.9161e-08	0
SISSER	2	12	13	19	0.19	1.1139e-08	0
SNAIL	2	65	66	117	0.63	1.6803e-13	0
SPMSRTLS	100	14	15	26	0.39	3.2303e-13	0
SPMSRTLS	28	12	13	22	0.23	3.2953e-16	0
SPMSRTLS	499	20	21	39	1.50	1.9096e-16	0
SROSENBR	10	6	7	10	0.11	4.6748e-17	0
SROSENBR	100	6	7	10	0.15	4.6748e-16	0
SROSENBR	50	6	7	10	0.13	2.3374e-16	0
SROSENBR	500	10	11	20	0.48	2.9154e-13	0
TOINTGOR	50	9	10	84	0.21	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.08	10	0
TOINTGSS	50	2	3	4	0.06	10	0
TOINTGSS	500	2	3	4	0.24	10	0
TOINTPSP	50	23	24	88	0.45	225.56	0
TOINTQOR	50	6	7	30	0.14	1175.5	0
TQUARTIC	100	12	13	35	0.28	2.7682e-11	0
TQUARTIC	5	1	2	2	0.04	4.4373e-31	0
TQUARTIC	50	10	11	35	0.20	5.2793e-13	0
TQUARTIC	500	15	16	42	0.76	4.787e-15	0
TRIDIA	10	1	2	2	0.04	1.0805e-30	0
TRIDIA	100	2	3	3	0.09	1.352e-32	0
TRIDIA	50	2	3	3	0.07	1.352e-32	0
TRIDIA	500	2	3	3	0.26	1.3482e-32	0
VARDIM	10	14	15	14	0.22	1.595e-26	0
VARDIM	100	25	26	25	0.59	5.171e-26	0
VARDIM	50	22	23	22	0.41	1.2641e-27	0
VARDIM	500	33	34	33	5.03	1.1634e-25	0
VAREIGVL	10	36	37	156	0.56	7.2928e-12	0
VAREIGVL	100	12	13	84	0.38	3.3727e-09	0

Table 128: NMTR1 with band preconditioning and $p = 30$ on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.30	2.9295e-10	0
VAREIGVL	500	12	13	63	1.59	2.0175e-08	0
VIBRBEAM	8	31	32	104	0.70	0.15647	3
WATSON	12	8	9	44	0.22	7.76e-08	0
WATSON	31	10	11	57	0.38	5.0956e-08	0
WOODS	100	15	16	28	0.32	2.0135e-17	0
WOODS	4	15	16	28	0.24	8.0539e-19	0
WOODS	500	16	17	31	0.73	9.8289e-15	0
YFITU	3	37	38	73	0.56	1.9632e-08	0
ZANGWIL2	2	1	2	1	0.02	-18.2	0
PFIT2LS	3	52	53	86	0.76	2.9525e-11	0
PFIT3LS	3	39	40	65	0.57	4.0587e-11	0
PFIT4LS	3	68	69	111	0.98	7.824e-13	0
EXTROSNB	10	297	298	626	4.35	1.3892e-08	0
EXTROSNB	50	417	418	833	6.77	1.7194e-07	0
EXTROSNB	100	439	440	877	7.99	1.5351e-07	0

Table 129: NMTR1 with band preconditioning and $p = 30$ on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.71	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.04	1.11e-12	0
BDQRTIC	1000	11	12	24	1.57	3983.8	0
BROYDN7D	1000	63	64	151	5.29	345.54	0
BRYBND	1000	16	17	46	2.50	1.8775e-12	0
BRYBND	5000	24	25	74	18.56	2.3487e-13	0
CRAGGLVY	1000	14	15	25	1.52	336.42	0
CRAGGLVY	5000	14	15	26	7.42	1688.2	0
DIXMAANA	1500	5	6	15	0.92	1	0
DIXMAANA	3000	5	6	15	1.85	1	0
DIXMAANB	1500	7	8	14	1.06	1	0
DIXMAANB	3000	7	8	14	2.12	1	0
DIXMAANC	1500	17	18	28	1.98	1	0
DIXMAANC	3000	14	15	27	3.59	1	0
DIXMAAND	1500	9	10	21	1.26	1	0
DIXMAAND	3000	11	12	24	2.85	1	0
DIXMAANE	1500	6	7	17	1.02	1	0
DIXMAANE	3000	6	7	17	2.02	1	0
DIXMAANF	1500	25	26	46	2.74	1	0
DIXMAANF	3000	43	44	81	8.21	1	0
DIXMAANG	1500	38	39	78	3.90	1	0
DIXMAANG	3000	57	58	108	10.52	1	0
DIXMAANH	1500	50	51	101	4.96	1	0
DIXMAANH	3000	81	82	159	14.85	1	0
DIXMAANI	1500	7	8	23	1.15	1	0
DIXMAANI	3000	7	8	29	2.39	1	0
DIXMAANJ	1500	77	78	171	7.07	1	0
DIXMAANJ	3000	35	36	86	7.19	1	0
DIXMAANK	1500	62	63	125	5.74	1	0
DIXMAANK	3000	32	33	69	6.38	1	0
DIXMAANL	1500	47	48	284	6.73	1	0
DIXMAANL	3000	57	58	122	10.89	1	0
DQDRTIC	1000	2	3	2	0.38	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.78	1.6602e-23	0
DQRTIC	1000	35	36	62	2.37	3.6952e-06	0
DQRTIC	5000	42	43	73	12.78	7.0042e-06	0
EDENSCH	2000	12	13	21	2.41	12003	0
EIGENALS	930	43	44	160	80.39	2.5686e-11	0
EIGENBLS	930	246	247	10615	1663.72	1.7207e-07	0
ENGVAL1	1000	7	8	14	0.79	1108.2	0
ENGVAL1	5000	7	8	14	3.81	5548.7	0
FLETCBV2	1000	0	1	0	0.31	-0.50134	0

Table 130: NMTR1 with band preconditioning and $p = 30$ on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1014.03	-1.8877e+06	1
FMINSURF	1024	246	247	640	83.40	1	0
FMINSURF	5625	247	248	830	1930.79	1	0
FREUROTH	1000	10	11	17	1.05	121470	0
FREUROTH	5000	10	11	17	5.04	608160	0
LIARWHD	1000	14	15	35	1.25	2.0274e-20	0
LIARWHD	5000	13	14	28	5.62	6.0958e-16	0
MOREBV	1000	1	2	2	0.37	7.3289e-13	0
MOREBV	5000	1	2	2	1.76	5.8478e-15	0
MSQRTALS	1024	37	38	4622	670.39	9.7882e-09	0
MSQRTALS	529	21	22	1985	89.23	4.0963e-08	0
MSQRTBLS	529	35	36	4165	179.19	2.6906e-08	0
MSQRTBLS	1024	24	25	2024	316.07	4.5054e-09	0
NCB20B	1000	22	23	590	50.80	1676	0
NONDIA	1000	23	24	58	1.77	4.1197e-12	0
NONDIA	5000	32	33	80	10.91	5.0265e-15	0
NONDIA	10000	33	34	81	22.65	1.2547e-07	0
NONDQUAR	1000	17	18	36	1.22	1.3932e-09	0
NONDQUAR	5000	18	19	37	5.72	1.0076e-09	0
NONDQUAR	10000	19	20	38	12.06	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	58	59	577	22.46	0.0096875	0
POWELLSG	1000	15	16	30	1.07	2.2324e-06	0
POWELLSG	5000	15	16	32	4.77	5.2976e-06	0
POWELLSG	10000	15	16	32	9.79	1.0595e-05	0
POWER	1000	27	28	80	7.54	1.8888e-08	0
QUARTC	1000	35	36	62	2.35	3.6952e-06	0
QUARTC	5000	42	43	73	12.87	7.0042e-06	0
QUARTC	10000	45	46	78	27.17	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.72	-2994	0
SCHMVETT	5000	3	4	6	3.45	-14994	0
SCHMVETT	10000	3	4	6	6.86	-29994	0
SINQUAD	1000	55	56	170	6.43	1.5526e-08	0
SINQUAD	5000	93	94	273	74.04	3.2718e-08	0
SINQUAD	10000	100	101	298	179.89	2.9553e-08	0
SPMSRTLS	1000	25	26	53	3.39	5.6048e-16	0
SPMSRTLS	4999	27	28	55	17.94	3.0578e-11	0
SPMSRTLS	10000	44	45	96	54.56	3.311e-13	0
SROSENBR	1000	10	11	20	0.83	5.8309e-13	0
SROSENBR	5000	10	11	20	3.71	2.9154e-12	0
SROSENBR	10000	10	11	20	7.56	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.56	7.6524e-11	0

Table 131: NMTR1 with band preconditioning and $p = 30$ on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.42	10	0
TOINTGSS	5000	2	3	4	2.01	10	0
TOINTGSS	10000	2	3	4	4.01	10	0
TQUARTIC	1000	12	13	36	1.16	2.9487e-11	0
TQUARTIC	5000	20	21	51	10.03	1.1107e-10	0
TQUARTIC	10000	18	19	44	23.14	3.5718e-15	0
TRIDIA	1000	2	3	3	0.48	1.3827e-32	0
TRIDIA	5000	2	3	3	2.15	4.1976e-33	0
TRIDIA	10000	2	3	3	4.32	5.3451e-33	0
VARDIM	1000	36	37	36	18.75	1.1203e-20	0
VARDIM	5000	45	46	45	547.43	1.1459e-18	0
VAREIGVL	1000	12	13	70	4.47	5.6139e-08	0
VAREIGVL	5000	13	14	59	83.41	7.7013e-08	0
WOODS	1000	16	17	31	1.24	1.9658e-14	0
WOODS	10000	16	17	31	11.89	1.9658e-13	0
FLETCHCR	1000	1321	1322	2642	79.95	1.5315e-20	0
GENROSE	1000	546	547	1188	30.90	1	0

Table 132: NMTR1 with band preconditioning and $p = 30$ on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	77	78	3267	19.23	0	0
CATENARY	501	662	663	13732	73.13	-348400	0
CHANDHEQ	100	13	14	62	6.80	6.7959e-08	0
CHEMRCTA	100	36	37	608	1.29	5.102e-15	0
CHEMRCTB	1000	52	53	165	6.28	6.1367e-20	0
CLPLATEC	5041	3	4	3935	199.15	-0.0050207	0
CORKSCRW	456	129	130	76738	223.27	26.484	0
DALLASM	196	82	83	15783	25.55	-48198	0
DISCS	36	162	163	4791	9.22	12	0
DRUGDIS	304	211	212	3821	19.62	4.2452	0
DTOC5	9999	25	26	91	44.87	1.5316	0
EXPFITB	5	62	63	902	2.55	0.0050193	0
EXPFITC	5	84	85	1696	13.69	0.023303	0
FCCU	19	16	17	57	0.33	11.149	0
FLETCHER	4	31	32	64	0.48	19.525	0
GILBERT	500	29	30	71	3.42	237.37	0
GRIDNETA	3444	35	36	3753	89.54	161.61	0
GRIDNETE	3444	27	28	2939	105.11	144.06	0
HADAMARD	257	304	305	22628	288.54	1	0
HAGER3	2001	12	13	32	4.01	0.14096	0
HAGER4	2001	11	12	2294	45.96	2.7942	0
HS114	10	803	804	4916	11.89	-1768.8	0
HS59	2	244	245	486	3.51	-7.8028	0
HS75	4	136	137	546	1.97	5174.4	0
HVYCRASH	204	228	229	2378	10.15	-0.2185	0
HYDROELL	1009	143	144	22557	255.69	-3.5855e+06	0
JUNKTURN	5010	80	81	1379	108.84	9.3915e-06	0
KSIP	20	69	70	3794	67.24	0.57579	0
LINVERSE	1999	25	26	963	43.91	681	0
LMINSURF	1024	299	300	844	29.04	9	0
MANNE	300	6	7	75	0.96	-0.97457	0
MEYER3	3	78	79	169	1.13	87.946	0
MINPERM	51	18	19	141	0.51	0.0384	0
MISTAKE	9	32	33	215	0.57	-1	0
NGONE	50	1134	1135	31185	162.52	-0.64103	0
NLMSURF	1024	1147	1148	3017	109.43	38.591	0
NYSTROM5	18	28	29	453	0.63	2.4426e-05	0
ODC	10404	19	20	916	144.48	-0.0040122	0
OET1	3	38	39	974	13.24	0.53824	0
OPTCTRL3	122	61	62	249	1.71	2048	0
ORTHREGA	2053	172	173	897	60.20	5661.4	0
ORTHREGC	5005	57	58	415	64.83	94.813	0

Table 133: NMTR1 with band preconditioning and $p = 30$ on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	543	544	2551	13.97	15.59	0
ORTHREGF	1205	168	169	403	20.13	22.553	0
PRODPL1	60	62	63	1260	1.71	35.739	3
QR3D	610	123	124	13934	397.10	1.1139e-08	0
QR3DBD	457	122	123	1770	51.52	2.1558e-10	0
READING1	202	764	765	17130	51.93	-0.16049	0
SEMICON1	102	571	572	1152	18.36	8.0944e-16	0
SEMICON2	1002	134	135	261	28.98	1.6734e-06	0
SIPOW1	2	40	41	1239	31.67	-1	0
SPANHYD	97	36	37	644	1.26	239.74	0
SSC	10404	1	2	93	28.43	-2.0782	0
SSEBNLN	194	64	65	1448	3.26	1.6171e+07	0
SSNLBEAM	3003	239	240	7246	274.10	340.03	0
STEENBRE	540	556	557	30921	64.94	27459	0
TENBARS1	18	313	314	4579	6.06	2295.4	0
TENBARS2	18	184	185	1380	3.13	2277.9	0
TRAINF	408	43	44	1275	5.35	3.0975	0
TRUSPYR1	11	477	478	2210	7.67	11.229	0
UBH5	1010	80	81	22512	139.83	1.1163	0
WATER	31	37	38	355	0.73	10549	0
ZIGZAG	304	89	90	17835	44.08	33.787	0

Table 134: NMTR1 with band preconditioning and $p = 30$ on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.14	5.7444	0
ARWHEAD	100	5	6	7	0.15	0	0
ARWHEAD	500	5	6	6	0.39	1.3237e-09	0
BARD	3	7	8	13	0.12	0.0082149	0
BDQRTIC	100	11	12	23	0.29	378.77	0
BDQRTIC	500	11	12	24	0.82	1981	0
BEALE	2	7	8	14	0.12	2.9425e-14	0
BIGGS6	6	90	91	193	1.27	9.263e-11	0
BOX3	3	7	8	13	0.13	1.9221e-11	0
BRKMCC	2	3	4	5	0.07	0.16904	0
BROWNAL	10	5	6	42	0.10	9.2726e-11	0
BROWNBS	2	34	35	50	0.49	0	0
BROWNDEN	4	11	12	20	0.19	85822	0
BROYDN7D	10	16	17	32	0.25	1.2611	0
BROYDN7D	100	30	31	65	0.64	29.362	0
BROYDN7D	500	48	49	109	2.33	169.56	0
BRYBND	10	11	12	36	0.19	7.2241e-15	0
BRYBND	100	12	13	38	0.36	1.3572e-12	0
BRYBND	500	15	16	43	1.29	1.7435e-13	0
CHNROSNB	10	25	26	50	0.37	4.308e-21	0
CLIFF	2	27	28	30	0.38	0.19979	0
CRAGGLVY	100	14	15	25	0.34	32.27	0
CRAGGLVY	4	16	17	30	0.25	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.87	167.45	0
CUBE	2	32	33	59	0.46	7.6271e-15	0
DENSCHNA	2	5	6	9	0.09	1.2e-15	0
DENSCHNB	2	3	4	5	0.06	0	0
DENSCHNC	2	9	10	13	0.15	1.8423e-13	0
DENSCHND	3	33	34	63	0.47	8.6576e-09	0
DENSCHNE	3	11	12	16	0.17	2.4642e-12	0
DENSCHNF	2	6	7	12	0.10	6.5139e-22	0
DIXMAANA	15	5	6	9	0.06	1	0
DIXMAANA	90	5	6	14	0.11	1	0
DIXMAANA	300	5	6	14	0.23	1	0
DIXMAANB	15	6	7	11	0.07	1	0
DIXMAANB	90	8	9	18	0.15	1	0
DIXMAANB	300	7	8	13	0.27	1	0
DIXMAANC	15	9	10	15	0.09	1	0
DIXMAANC	90	9	10	16	0.17	1	0
DIXMAANC	300	11	12	20	0.39	1	0
DIXMAAND	15	9	10	16	0.12	1	0
DIXMAAND	90	10	11	21	0.18	1	0

Table 135: NMTR1 with band preconditioning and $p = 35$ on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.38	1	0
DIXMAANE	15	6	7	12	0.08	1	0
DIXMAANE	90	6	7	16	0.13	1	0
DIXMAANE	300	6	7	16	0.26	1	0
DIXMAANF	15	10	11	20	0.12	1	0
DIXMAANF	90	10	11	21	0.17	1	0
DIXMAANF	300	47	48	99	1.22	1	0
DIXMAANG	15	11	12	22	0.13	1	0
DIXMAANG	90	16	17	33	0.26	1	0
DIXMAANG	300	24	25	47	0.72	1	0
DIXMAANH	15	13	14	26	0.13	1	0
DIXMAANH	90	19	20	40	0.29	1	0
DIXMAANH	300	26	27	49	0.75	1	0
DIXMAANI	15	5	6	11	0.07	1	0
DIXMAANI	90	6	7	15	0.13	1	0
DIXMAANI	300	6	7	15	0.25	1	0
DIXMAANJ	15	12	13	24	0.13	1	0
DIXMAANJ	90	20	21	42	0.31	1	0
DIXMAANJ	300	21	22	43	0.66	1	0
DIXMAANK	15	16	17	32	0.17	1	0
DIXMAANK	90	18	19	37	0.30	1	0
DIXMAANK	300	37	38	75	1.01	1	0
DIXMAANL	15	15	16	29	0.17	1	0
DIXMAANL	90	32	33	66	0.47	1	0
DIXMAANL	300	51	52	102	1.30	1	0
DIXON3DQ	10	2	3	4	0.06	0	0
DJTL	2	135	136	185	1.82	-8951.5	0
DQDRTIC	10	2	3	2	0.05	1.6602e-23	0
DQDRTIC	100	2	3	2	0.08	1.6602e-23	0
DQDRTIC	500	2	3	2	0.23	1.6602e-23	0
DQRTIC	100	26	27	47	0.49	4.5801e-07	0
DQRTIC	500	33	34	59	1.32	5.8379e-07	0
EDENSCH	36	12	13	21	0.22	219.28	0
EIGENALS	110	20	21	70	1.02	1.022e-10	0
EIGENALS	420	35	36	120	14.99	1.7732e-11	0
EIGENBLS	110	71	72	992	7.35	1.7454e-09	0
EIGENBLS	420	190	191	6498	295.93	2.7312e-08	0
EIGENCLS	462	204	205	2487	201.70	1.2793e-09	0
ENGVAL1	100	7	8	14	0.19	109.09	0
ENGVAL1	2	7	8	12	0.12	0	0
ERRINROS	10	46	47	85	0.67	6.6946	0
ERRINROS	50	50	51	97	0.83	39.904	0

Table 136: NMTR1 with band preconditioning and $p = 35$ on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.20	0.24051	0
EXTROSNB	5	34	35	67	0.49	1.0288e-12	0
FLETCBV2	100	1	2	2	0.07	-0.51401	0
FLETCBV3	100	10000	10001	20356	214.07	-1656.3	1
FLETCHBV	10	320	321	592	4.50	-2.0742e+06	0
FLETCHBV	100	10000	10001	16863	173.33	-1.4795e+11	1
FLETCHCR	10	26	27	52	0.39	2.0952e-18	0
FLETCHCR	100	144	145	288	2.67	1.1673e-17	0
FMINSURF	121	67	68	184	1.97	1	0
FMINSURF	16	17	18	35	0.27	1	0
FREUROTH	100	10	11	17	0.24	11965	0
FREUROTH	2	9	10	14	0.16	48.984	0
FREUROTH	50	10	11	17	0.19	5881	0
FREUROTH	500	10	11	17	0.60	60634	0
GENROSE	10	30	31	58	0.44	1	0
GENROSE	100	67	68	153	1.29	1	0
GENROSE	500	284	285	633	10.19	1	0
GROWTHLS	3	70	71	117	1.02	1.004	0
GULF	3	31	32	59	0.65	2.5375e-14	0
HAIRY	2	63	64	101	0.57	20	0
HATFLDD	3	19	20	37	0.30	6.6151e-08	0
HATFLDE	3	22	23	43	0.32	5.1204e-07	0
HEART6LS	6	865	866	1737	12.72	1.6115e-11	0
HELIX	3	12	13	23	0.19	2.9584e-13	0
HILBERTA	2	2	3	2	0.04	6.656e-31	0
HILBERTB	5	2	3	2	0.03	1.5953e-29	0
HIMMELBB	2	12	13	15	0.18	2.0444e-23	0
HIMMELBF	4	45	46	147	0.69	318.57	0
HIMMELBG	2	8	9	11	0.09	5.1108e-17	0
HIMMELBH	2	1	2	1	0.03	-1	0
HYDC20LS	0	—	—	—	—	—	6
JENSMP	2	9	10	14	0.15	124.36	0
KOWOSB	4	10	11	20	0.17	0.0003078	0
LIARWHD	100	13	14	37	0.32	9.0888e-21	0
LIARWHD	36	10	11	32	0.21	1.1625e-16	0
LIARWHD	500	15	16	36	0.78	3.7352e-14	0
LOGROS	2	38	39	54	0.52	6.0976e-12	0
MANCINO	100	15	16	23	17.60	9.2449e-18	0
MOREBV	10	2	3	4	0.05	6.582e-14	0
MOREBV	100	1	2	2	0.08	7.887e-10	0
MOREBV	500	1	2	2	0.23	5.9316e-12	0
MSQRTALS	100	17	18	245	1.53	5.5682e-10	0

Table 137: NMTR1 with band preconditioning and $p = 35$ on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.22	6.2623e-12	0
MSQRTALS	49	19	20	143	0.63	1.3997e-10	0
MSQRTBLS	100	24	25	379	2.21	4.8675e-10	0
MSQRTBLS	49	17	18	161	0.60	2.0502e-10	0
MSQRTBLS	9	13	14	36	0.22	4.8784e-11	0
NCB20B	100	22	23	931	5.59	196.68	0
NCB20B	50	26	27	651	1.83	99.504	0
NCB20B	500	21	22	727	30.26	897.52	0
NONDIA	100	19	20	47	0.41	2.898e-15	0
NONDIA	50	19	20	48	0.34	6.6466e-13	0
NONDIA	500	18	19	42	0.88	2.4158e-10	0
NONDQUAR	100	15	16	37	0.35	2.2854e-09	0
NONDQUAR	500	16	17	36	0.72	3.9386e-09	0
NONMSQRT	100	—	—	—	—	—	6
NONMSQRT	49	—	—	—	—	—	6
NONMSQRT	9	63	64	168	1.06	0.75193	0
OSBORNEA	5	40	41	92	0.66	5.4679e-05	0
OSBORNEB	11	19	20	78	0.54	0.040138	0
PALMER1C	8	20	21	174	0.38	0.097605	0
PALMER1D	7	14	15	56	0.25	0.65267	0
PALMER2C	8	19	20	200	0.34	0.014369	0
PALMER3C	8	11	12	78	0.20	0.019539	0
PALMER4C	8	24	25	215	0.43	0.050312	0
PENALTY1	10	43	44	187	0.66	7.098e-05	0
PENALTY1	100	53	54	653	1.55	0.00090254	0
PENALTY1	50	50	51	491	1.05	0.0004318	0
PENALTY1	500	59	60	632	7.92	0.0047793	0
PENALTY2	10	69	70	240	1.08	0.00029386	0
PENALTY2	100	19	20	87	0.58	97096	0
PENALTY2	50	30	31	154	0.67	4.2961	0
PENALTY3	100	22	23	55	21.13	0.001	0
PENALTY3	50	21	22	56	4.16	0.001	0
PFIT1LS	3	188	189	372	2.71	9.7326e-07	0
POWELLSG	100	15	16	30	0.32	2.1902e-07	0
POWELLSG	500	15	16	30	0.65	1.1139e-06	0
POWELLSG	20	15	16	30	0.25	4.0054e-08	0
POWELLSG	4	15	16	30	0.23	4.2527e-09	0
POWER	10	16	17	40	0.26	1.1098e-08	0
POWER	100	22	23	66	0.52	5.0264e-09	0
POWER	50	19	20	54	0.38	2.3411e-08	0
POWER	500	26	27	78	2.47	5.9786e-09	0
QUARTC	100	26	27	47	0.52	4.5801e-07	0

Table 138: NMTR1 with band preconditioning and $p = 35$ on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.35	5.2022e-08	0
QUARTC	500	33	34	59	1.33	5.8379e-07	0
ROSENBR	2	26	27	45	0.38	3.2328e-13	0
S308	2	10	11	16	0.16	0.7732	0
SCHMVETT	10	3	4	6	0.05	-24	0
SCHMVETT	500	3	4	6	0.37	-1494	0
SCHMVETT	3	3	4	6	0.05	-3	0
SCHMVETT	500	3	4	6	0.37	-1494	0
SINQUAD	100	40	41	140	0.97	4.1555e-08	0
SINQUAD	5	11	12	22	0.19	1.1721e-08	0
SINQUAD	50	33	34	124	0.66	1.4352e-07	0
SINQUAD	500	51	52	158	3.05	1.9161e-08	0
SISSER	2	12	13	19	0.20	1.1139e-08	0
SNAIL	2	65	66	117	0.65	1.6803e-13	0
SPMSRTLS	100	14	15	26	0.39	3.2303e-13	0
SPMSRTLS	28	12	13	22	0.23	3.2953e-16	0
SPMSRTLS	499	20	21	39	1.52	1.9096e-16	0
SROSENBR	10	6	7	10	0.11	4.6748e-17	0
SROSENBR	100	6	7	10	0.16	4.6748e-16	0
SROSENBR	50	6	7	10	0.13	2.3374e-16	0
SROSENBR	500	10	11	20	0.51	2.9154e-13	0
TOINTGOR	50	9	10	84	0.22	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.07	10	0
TOINTGSS	50	2	3	4	0.06	10	0
TOINTGSS	500	2	3	4	0.24	10	0
TOINTPSP	50	23	24	88	0.44	225.56	0
TOINTQOR	50	6	7	30	0.14	1175.5	0
TQUARTIC	100	12	13	35	0.28	2.7682e-11	0
TQUARTIC	5	1	2	2	0.03	4.4373e-31	0
TQUARTIC	50	10	11	35	0.20	5.2793e-13	0
TQUARTIC	500	15	16	42	0.78	4.787e-15	0
TRIDIA	10	1	2	2	0.04	1.0805e-30	0
TRIDIA	100	2	3	3	0.09	1.352e-32	0
TRIDIA	50	2	3	3	0.08	1.352e-32	0
TRIDIA	500	2	3	3	0.27	1.3482e-32	0
VARDIM	10	14	15	14	0.23	1.595e-26	0
VARDIM	100	25	26	25	0.60	5.171e-26	0
VARDIM	50	22	23	22	0.41	1.2641e-27	0
VARDIM	500	33	34	33	5.06	1.1634e-25	0
VAREIGVL	10	36	37	156	0.57	7.2928e-12	0
VAREIGVL	100	12	13	84	0.39	3.3727e-09	0

Table 139: NMTR1 with band preconditioning and $p = 35$ on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.30	2.9295e-10	0
VAREIGVL	500	12	13	63	1.62	2.0175e-08	0
VIBRBEAM	8	31	32	104	0.71	0.15647	3
WATSON	12	8	9	44	0.22	7.76e-08	0
WATSON	31	10	11	57	0.38	5.0956e-08	0
WOODS	100	15	16	28	0.33	2.0135e-17	0
WOODS	4	15	16	28	0.24	8.0539e-19	0
WOODS	500	16	17	31	0.73	9.8289e-15	0
YFITU	3	37	38	73	0.57	1.9632e-08	0
ZANGWIL2	2	1	2	1	0.03	-18.2	0
PFIT2LS	3	52	53	86	0.76	2.9525e-11	0
PFIT3LS	3	39	40	65	0.59	4.0587e-11	0
PFIT4LS	3	68	69	111	1.01	7.824e-13	0
EXTROSNB	10	88	89	179	1.29	2.9688e-07	0
EXTROSNB	50	482	483	963	7.97	1.4812e-07	0
EXTROSNB	100	273	274	545	5.11	1.5285e-07	0

Table 140: NMTR1 with band preconditioning and $p = 35$ on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.73	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.16	1.11e-12	0
BDQRTIC	1000	11	12	24	1.59	3983.8	0
BROYDN7D	1000	63	64	151	5.35	345.54	0
BRYBND	1000	16	17	46	2.54	1.8775e-12	0
BRYBND	5000	24	25	74	18.70	2.3487e-13	0
CRAGGLVY	1000	14	15	25	1.52	336.42	0
CRAGGLVY	5000	14	15	26	7.56	1688.2	0
DIXMAANA	1500	5	6	15	0.95	1	0
DIXMAANA	3000	5	6	15	1.91	1	0
DIXMAANB	1500	7	8	14	1.11	1	0
DIXMAANB	3000	7	8	14	2.21	1	0
DIXMAANC	1500	17	18	28	2.00	1	0
DIXMAANC	3000	14	15	27	3.63	1	0
DIXMAAND	1500	9	10	21	1.32	1	0
DIXMAAND	3000	11	12	24	2.91	1	0
DIXMAANE	1500	6	7	17	1.05	1	0
DIXMAANE	3000	6	7	17	2.11	1	0
DIXMAANF	1500	25	26	46	2.78	1	0
DIXMAANF	3000	43	44	81	8.27	1	0
DIXMAANG	1500	38	39	78	3.94	1	0
DIXMAANG	3000	57	58	109	10.63	1	0
DIXMAANH	1500	50	51	101	4.98	1	0
DIXMAANH	3000	83	84	168	15.55	1	0
DIXMAANI	1500	7	8	23	1.16	1	0
DIXMAANI	3000	7	8	29	2.46	1	0
DIXMAANJ	1500	75	76	168	6.95	1	0
DIXMAANJ	3000	35	36	86	7.28	1	0
DIXMAANK	1500	62	63	125	5.84	1	0
DIXMAANK	3000	32	33	69	6.49	1	0
DIXMAANL	1500	47	48	284	6.79	1	0
DIXMAANL	3000	57	58	122	10.97	1	0
DQDRTIC	1000	2	3	2	0.41	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.92	1.6602e-23	0
DQRTIC	1000	35	36	62	2.39	3.6952e-06	0
DQRTIC	5000	42	43	73	12.87	7.0042e-06	0
EDENSCH	2000	12	13	21	2.46	12003	0
EIGENALS	930	43	44	160	80.47	2.5686e-11	0
EIGENBLS	930	207	208	9175	1425.21	1.1708e-07	0
ENGVAL1	1000	7	8	14	0.84	1108.2	0
ENGVAL1	5000	7	8	14	4.04	5548.7	0
FLETCBV2	1000	0	1	0	0.35	-0.50134	0

Table 141: NMTR1 with band preconditioning and $p = 35$ on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1022.28	-1.8877e+06	1
FMINSURF	1024	379	380	924	127.95	1	0
FMINSURF	5625	321	322	875	2511.85	1	0
FREUROTH	1000	10	11	17	1.10	121470	0
FREUROTH	5000	10	11	17	5.19	608160	0
LIARWHD	1000	14	15	35	1.31	2.0274e-20	0
LIARWHD	5000	13	14	28	5.84	6.0958e-16	0
MOREBV	1000	1	2	2	0.41	7.3289e-13	0
MOREBV	5000	1	2	2	1.91	5.8478e-15	0
MSQRTALS	1024	37	38	4622	670.62	9.7882e-09	0
MSQRTALS	529	21	22	1985	89.02	4.0963e-08	0
MSQRTBLS	529	35	36	4165	178.61	2.6906e-08	0
MSQRTBLS	1024	24	25	2024	314.82	4.5054e-09	0
NCB20B	1000	22	23	590	50.70	1676	0
NONDIA	1000	23	24	58	1.78	4.1197e-12	0
NONDIA	5000	32	33	80	10.98	5.0265e-15	0
NONDIA	10000	33	34	81	22.87	1.2547e-07	0
NONDQUAR	1000	17	18	36	1.24	1.3932e-09	0
NONDQUAR	5000	18	19	37	5.84	1.0076e-09	0
NONDQUAR	10000	19	20	38	12.28	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	58	59	577	22.65	0.0096875	0
POWELLSG	1000	15	16	30	1.08	2.2324e-06	0
POWELLSG	5000	15	16	32	4.96	5.2976e-06	0
POWELLSG	10000	15	16	32	10.01	1.0595e-05	0
POWER	1000	27	28	80	7.53	1.8888e-08	0
QUARTC	1000	35	36	62	2.38	3.6952e-06	0
QUARTC	5000	42	43	73	12.90	7.0042e-06	0
QUARTC	10000	45	46	78	27.48	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.71	-2994	0
SCHMVETT	5000	3	4	6	3.50	-14994	0
SCHMVETT	10000	3	4	6	6.98	-29994	0
SINQUAD	1000	55	56	170	6.30	1.5526e-08	0
SINQUAD	5000	93	94	273	73.18	3.2718e-08	0
SINQUAD	10000	87	88	254	158.60	2.4936e-08	0
SPMSRTLS	1000	25	26	53	3.35	5.6048e-16	0
SPMSRTLS	4999	27	28	55	17.84	3.0578e-11	0
SPMSRTLS	10000	44	45	96	54.39	3.311e-13	0
SROSENBR	1000	10	11	20	0.84	5.8309e-13	0
SROSENBR	5000	10	11	20	3.83	2.9154e-12	0
SROSENBR	10000	10	11	20	7.73	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.58	7.6524e-11	0

Table 142: NMTR1 with band preconditioning and $p = 35$ on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.45	10	0
TOINTGSS	5000	2	3	4	2.12	10	0
TOINTGSS	10000	2	3	4	4.24	10	0
TQUARTIC	1000	12	13	36	1.19	2.9487e-11	0
TQUARTIC	5000	20	21	51	10.13	1.1107e-10	0
TQUARTIC	10000	18	19	44	23.31	3.5718e-15	0
TRIDIA	1000	2	3	3	0.50	1.3827e-32	0
TRIDIA	5000	2	3	3	2.30	4.1976e-33	0
TRIDIA	10000	2	3	3	4.56	5.3451e-33	0
VARDIM	1000	36	37	36	18.80	1.1203e-20	0
VARDIM	5000	45	46	45	546.45	1.1459e-18	0
VAREIGVL	1000	12	13	70	4.50	5.6139e-08	0
VAREIGVL	5000	13	14	59	83.80	7.7013e-08	0
WOODS	1000	16	17	31	1.24	1.9658e-14	0
WOODS	10000	16	17	31	12.08	1.9658e-13	0
FLETCHCR	1000	1321	1322	2642	80.16	1.5315e-20	0
GENROSE	1000	524	525	1156	30.33	1	0

Table 143: NMTR1 with band preconditioning and $p = 35$ on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	77	78	3267	19.09	0	0
CATENARY	501	726	727	14153	76.18	-348400	0
CHANDHEQ	100	13	14	62	6.79	6.7959e-08	0
CHEMRCTA	100	36	37	608	1.27	5.102e-15	0
CHEMRCTB	1000	52	53	165	6.29	6.1367e-20	0
CLPLATEC	5041	3	4	3935	199.55	-0.0050207	0
CORKSCRW	456	129	130	76738	223.19	26.484	0
DALLASM	196	82	83	15783	25.16	-48198	0
DISCS	36	224	225	6676	12.42	12	0
DRUGDIS	304	211	212	3821	19.37	4.2452	0
DTOC5	9999	25	26	91	47.03	1.5316	0
EXPFITB	5	62	63	902	2.55	0.0050193	0
EXPFITC	5	84	85	1696	13.71	0.023303	0
FCCU	19	16	17	57	0.33	11.149	0
FLETCHER	4	31	32	64	0.49	19.525	0
GILBERT	500	29	30	71	3.44	237.37	0
GRIDNETA	3444	35	36	3753	89.78	161.61	0
GRIDNETE	3444	27	28	2939	105.45	144.06	0
HADAMARD	257	304	305	22628	287.94	1	0
HAGER3	2001	12	13	32	4.19	0.14096	0
HAGER4	2001	11	12	2294	46.15	2.7942	0
HS114	10	788	789	4817	12.12	-1768.8	0
HS59	2	240	241	480	3.52	-7.8028	0
HS75	4	136	137	546	2.05	5174.4	0
HVYCRASH	204	228	229	2376	10.12	-0.2185	0
HYDROELL	1009	143	144	22557	256.53	-3.5855e+06	0
JUNKTURN	5010	79	80	1332	106.43	9.3903e-06	0
KSIP	20	69	70	3794	67.56	0.57579	0
LINVERSE	1999	25	26	963	43.88	681	0
LMINSURF	1024	368	369	934	35.03	9	0
MANNE	300	6	7	75	0.98	-0.97457	0
MEYER3	3	78	79	169	1.14	87.946	0
MINPERM	51	18	19	141	0.50	0.0384	0
MISTAKE	9	32	33	215	0.59	-1	0
NGONE	50	1134	1135	31185	161.98	-0.64103	0
NLMSURF	1024	979	980	2660	94.66	38.591	0
NYSTROM5	18	28	29	453	0.63	2.4426e-05	0
ODC	10404	19	20	916	143.65	-0.0040122	0
OET1	3	38	39	974	13.51	0.53824	0
OPTCTRL3	122	61	62	249	1.73	2048	0
ORTHREGA	2053	172	173	897	60.53	5661.4	0
ORTHREGC	5005	57	58	415	65.29	94.813	0

Table 144: NMTR1 with band preconditioning and $p = 35$ on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	484	485	2368	12.39	15.59	0
ORTHREGF	1205	192	193	454	22.69	20.606	0
PRODPL1	60	61	62	1159	1.60	35.739	0
QR3D	610	131	132	14348	410.66	4.9185e-09	0
QR3DBD	457	122	123	1770	51.58	2.1558e-10	0
READING1	202	739	740	16705	50.33	-0.16049	0
SEMICON1	102	545	546	1114	16.72	8.9658e-16	0
SEMICON2	1002	134	135	261	29.32	1.6734e-06	0
SIPOW1	2	40	41	1239	32.10	-1	0
SPANHYD	97	42	43	787	1.42	239.74	0
SSC	10404	1	2	93	28.30	-2.0782	0
SSEBNLN	194	62	63	1473	3.25	1.6171e+07	0
SSNLBEAM	3003	239	240	7246	275.57	340.03	0
STEENBRE	540	376	377	21924	46.47	27459	0
TENBARS1	18	384	385	5412	7.34	2295.4	0
TENBARS2	18	213	214	1679	3.61	2277.9	0
TRAINF	408	43	44	1275	5.42	3.0975	0
TRUSPYR1	11	493	494	2282	7.95	11.229	0
UBH5	1010	80	81	22512	140.55	1.1163	0
WATER	31	37	38	340	0.74	10549	0
ZIGZAG	304	89	90	17835	44.08	33.787	0

Table 145: NMTR1 with band preconditioning and $p = 35$ on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.15	5.7444	0
ARWHEAD	100	5	6	7	0.14	0	0
ARWHEAD	500	5	6	6	0.39	1.3237e-09	0
BARD	3	7	8	13	0.12	0.0082149	0
BDQRTIC	100	11	12	23	0.31	378.77	0
BDQRTIC	500	11	12	24	0.84	1981	0
BEALE	2	7	8	14	0.12	2.9425e-14	0
BIGGS6	6	140	141	308	2.07	5.1148e-12	0
BOX3	3	7	8	13	0.12	1.9221e-11	0
BRKMCC	2	3	4	5	0.07	0.16904	0
BROWNAL	10	5	6	42	0.11	9.2726e-11	0
BROWNBS	2	34	35	50	0.49	0	0
BROWNDEN	4	11	12	20	0.19	85822	0
BROYDN7D	10	16	17	32	0.26	1.2611	0
BROYDN7D	100	30	31	65	0.65	29.362	0
BROYDN7D	500	48	49	109	2.32	169.56	0
BRYBND	10	11	12	36	0.18	7.2241e-15	0
BRYBND	100	12	13	38	0.38	1.3572e-12	0
BRYBND	500	15	16	43	1.27	1.7435e-13	0
CHNROSNB	10	25	26	50	0.38	4.308e-21	0
CLIFF	2	27	28	30	0.39	0.19979	0
CRAGGLVY	100	14	15	25	0.35	32.27	0
CRAGGLVY	4	16	17	30	0.25	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.85	167.45	0
CUBE	2	32	33	59	0.44	7.6271e-15	0
DENSCHNA	2	5	6	9	0.08	1.2e-15	0
DENSCHNB	2	3	4	5	0.06	0	0
DENSCHNC	2	9	10	13	0.15	1.8423e-13	0
DENSCHND	3	33	34	63	0.50	8.6576e-09	0
DENSCHNE	3	11	12	16	0.18	2.4642e-12	0
DENSCHNF	2	6	7	12	0.10	6.5139e-22	0
DIXMAANA	15	5	6	9	0.07	1	0
DIXMAANA	90	5	6	14	0.12	1	0
DIXMAANA	300	5	6	14	0.24	1	0
DIXMAANB	15	6	7	11	0.08	1	0
DIXMAANB	90	8	9	18	0.16	1	0
DIXMAANB	300	7	8	13	0.28	1	0
DIXMAANC	15	9	10	15	0.11	1	0
DIXMAANC	90	9	10	16	0.18	1	0
DIXMAANC	300	11	12	20	0.40	1	0
DIXMAAND	15	9	10	16	0.11	1	0
DIXMAAND	90	10	11	21	0.18	1	0

Table 146: NMTR1 with band preconditioning and $p = 40$ on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.39	1	0
DIXMAANE	15	6	7	12	0.08	1	0
DIXMAANE	90	6	7	16	0.13	1	0
DIXMAANE	300	6	7	16	0.26	1	0
DIXMAANF	15	10	11	20	0.12	1	0
DIXMAANF	90	10	11	21	0.19	1	0
DIXMAANF	300	47	48	99	1.24	1	0
DIXMAANG	15	11	12	22	0.12	1	0
DIXMAANG	90	16	17	33	0.27	1	0
DIXMAANG	300	24	25	47	0.73	1	0
DIXMAANH	15	13	14	26	0.14	1	0
DIXMAANH	90	19	20	40	0.31	1	0
DIXMAANH	300	26	27	49	0.75	1	0
DIXMAANI	15	5	6	11	0.07	1	0
DIXMAANI	90	6	7	15	0.13	1	0
DIXMAANI	300	6	7	15	0.26	1	0
DIXMAANJ	15	12	13	24	0.14	1	0
DIXMAANJ	90	20	21	42	0.31	1	0
DIXMAANJ	300	21	22	43	0.65	1	0
DIXMAANK	15	16	17	32	0.17	1	0
DIXMAANK	90	18	19	37	0.30	1	0
DIXMAANK	300	37	38	75	1.02	1	0
DIXMAANL	15	15	16	29	0.17	1	0
DIXMAANL	90	32	33	66	0.47	1	0
DIXMAANL	300	51	52	102	1.33	1	0
DIXON3DQ	10	2	3	4	0.05	0	0
DJTL	2	135	136	185	1.87	-8951.5	0
DQDRTIC	10	2	3	2	0.05	1.6602e-23	0
DQDRTIC	100	2	3	2	0.08	1.6602e-23	0
DQDRTIC	500	2	3	2	0.24	1.6602e-23	0
DQRTIC	100	26	27	47	0.51	4.5801e-07	0
DQRTIC	500	33	34	59	1.33	5.8379e-07	0
EDENSCH	36	12	13	21	0.22	219.28	0
EIGENALS	110	20	21	70	1.01	1.022e-10	0
EIGENALS	420	35	36	120	14.94	1.7732e-11	0
EIGENBLS	110	71	72	992	7.33	1.7454e-09	0
EIGENBLS	420	195	196	6665	303.76	3.5127e-08	0
EIGENCLS	462	180	181	2223	178.83	6.1873e-10	0
ENGVAL1	100	7	8	14	0.18	109.09	0
ENGVAL1	2	7	8	12	0.11	0	0
ERRINROS	10	46	47	85	0.68	6.6946	0
ERRINROS	50	50	51	97	0.85	39.904	0

Table 147: NMTR1 with band preconditioning and $p = 40$ on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.20	0.24051	0
EXTROSNB	5	34	35	67	0.51	1.0288e-12	0
FLETCBV2	100	1	2	2	0.08	-0.51401	0
FLETCBV3	100	10000	10001	20356	218.52	-1656.3	1
FLETCHBV	10	320	321	592	4.52	-2.0742e+06	0
FLETCHBV	100	10000	10001	16863	175.92	-1.4795e+11	1
FLETCHCR	10	26	27	52	0.38	2.0952e-18	0
FLETCHCR	100	144	145	288	2.75	1.1673e-17	0
FMINSURF	121	70	71	191	2.04	1	0
FMINSURF	16	17	18	35	0.27	1	0
FREUROTH	100	10	11	17	0.24	11965	0
FREUROTH	2	9	10	14	0.15	48.984	0
FREUROTH	50	10	11	17	0.20	5881	0
FREUROTH	500	10	11	17	0.60	60634	0
GENROSE	10	30	31	58	0.45	1	0
GENROSE	100	65	66	149	1.28	1	0
GENROSE	500	291	292	624	10.45	1	0
GROWTHLS	3	70	71	117	1.04	1.004	0
GULF	3	31	32	59	0.65	2.5375e-14	0
HAIRY	2	62	63	100	0.59	20	0
HATFLDD	3	19	20	37	0.30	6.6151e-08	0
HATFLDE	3	22	23	43	0.35	5.1204e-07	0
HEART6LS	6	845	846	1701	12.55	3.1638e-10	0
HELIX	3	12	13	23	0.19	2.9584e-13	0
HILBERTA	2	2	3	2	0.03	6.656e-31	0
HILBERTB	5	2	3	2	0.04	1.5953e-29	0
HIMMELBB	2	12	13	15	0.19	2.0444e-23	0
HIMMELBF	4	45	46	147	0.70	318.57	0
HIMMELBG	2	8	9	11	0.09	5.1108e-17	0
HIMMELBH	2	1	2	1	0.03	-1	0
HYDC20LS	99	10000	10001	1125175	2651.73	0.060177	1
JENSMP	2	9	10	14	0.16	124.36	0
KOWOSB	4	10	11	20	0.16	0.0003078	0
LIARWHD	100	13	14	37	0.32	9.0888e-21	0
LIARWHD	36	10	11	32	0.21	1.1625e-16	0
LIARWHD	500	15	16	36	0.78	3.7352e-14	0
LOGROS	2	38	39	54	0.57	6.0976e-12	0
MANCINO	100	15	16	23	17.62	9.2449e-18	0
MOREBV	10	2	3	4	0.06	6.582e-14	0
MOREBV	100	1	2	2	0.07	7.887e-10	0
MOREBV	500	1	2	2	0.22	5.9316e-12	0
MSQRTALS	100	17	18	245	1.56	5.5682e-10	0

Table 148: NMTR1 with band preconditioning and $p = 40$ on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.24	6.2623e-12	0
MSQRTALS	49	19	20	143	0.62	1.3997e-10	0
MSQRTBLS	100	24	25	379	2.20	4.8675e-10	0
MSQRTBLS	49	17	18	161	0.59	2.0502e-10	0
MSQRTBLS	9	13	14	36	0.21	4.8784e-11	0
NCB20B	100	22	23	931	5.53	196.68	0
NCB20B	50	26	27	651	1.81	99.504	0
NCB20B	500	21	22	727	30.28	897.52	0
NONDIA	100	19	20	47	0.41	2.898e-15	0
NONDIA	50	19	20	48	0.34	6.6466e-13	0
NONDIA	500	18	19	42	0.88	2.4158e-10	0
NONDQUAR	100	15	16	37	0.33	2.2854e-09	0
NONDQUAR	500	16	17	36	0.72	3.9386e-09	0
NONMSQRT	100	—	—	—	—	—	6
NONMSQRT	49	—	—	—	—	—	6
NONMSQRT	9	63	64	168	0.95	0.75193	0
OSBORNEA	5	40	41	92	0.66	5.4679e-05	0
OSBORNEB	11	19	20	78	0.53	0.040138	0
PALMER1C	8	20	21	174	0.36	0.097605	0
PALMER1D	7	14	15	56	0.24	0.65267	0
PALMER2C	8	19	20	200	0.35	0.014369	0
PALMER3C	8	11	12	78	0.20	0.019539	0
PALMER4C	8	24	25	215	0.43	0.050312	0
PENALTY1	10	43	44	187	0.60	7.098e-05	0
PENALTY1	100	53	54	653	1.49	0.00090254	0
PENALTY1	50	50	51	491	0.99	0.0004318	0
PENALTY1	500	59	60	632	7.92	0.0047793	0
PENALTY2	10	69	70	240	1.04	0.00029386	0
PENALTY2	100	19	20	87	0.57	97096	0
PENALTY2	50	30	31	154	0.64	4.2961	0
PENALTY3	100	22	23	55	20.92	0.001	0
PENALTY3	50	21	22	56	4.14	0.001	0
PFIT1LS	3	173	174	344	2.45	6.6925e-07	0
POWELLSG	100	15	16	30	0.31	2.1902e-07	0
POWELLSG	500	15	16	30	0.65	1.1139e-06	0
POWELLSG	20	15	16	30	0.25	4.0054e-08	0
POWELLSG	4	15	16	30	0.23	4.2527e-09	0
POWER	10	16	17	40	0.26	1.1098e-08	0
POWER	100	22	23	66	0.51	5.0264e-09	0
POWER	50	19	20	54	0.35	2.3411e-08	0
POWER	500	26	27	78	2.47	5.9786e-09	0
QUARTC	100	26	27	47	0.52	4.5801e-07	0

Table 149: NMTR1 with band preconditioning and $p = 40$ on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.35	5.2022e-08	0
QUARTC	500	33	34	59	1.34	5.8379e-07	0
ROSENBR	2	26	27	45	0.38	3.2328e-13	0
S308	2	10	11	16	0.16	0.7732	0
SCHMVETT	10	3	4	6	0.05	-24	0
SCHMVETT	500	3	4	6	0.39	-1494	0
SCHMVETT	3	3	4	6	0.05	-3	0
SCHMVETT	500	3	4	6	0.38	-1494	0
SINQUAD	100	40	41	140	0.95	4.1555e-08	0
SINQUAD	5	11	12	22	0.18	1.1721e-08	0
SINQUAD	50	33	34	124	0.64	1.4352e-07	0
SINQUAD	500	51	52	158	3.02	1.9161e-08	0
SISSER	2	12	13	19	0.19	1.1139e-08	0
SNAIL	2	65	66	117	0.64	1.6803e-13	0
SPMSRTLS	100	14	15	26	0.38	3.2303e-13	0
SPMSRTLS	28	12	13	22	0.22	3.2953e-16	0
SPMSRTLS	499	20	21	39	1.52	1.9096e-16	0
SROSENBR	10	6	7	10	0.11	4.6748e-17	0
SROSENBR	100	6	7	10	0.16	4.6748e-16	0
SROSENBR	50	6	7	10	0.13	2.3374e-16	0
SROSENBR	500	10	11	20	0.50	2.9154e-13	0
TOINTGOR	50	9	10	84	0.21	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.08	10	0
TOINTGSS	50	2	3	4	0.05	10	0
TOINTGSS	500	2	3	4	0.25	10	0
TOINTPSP	50	23	24	88	0.45	225.56	0
TOINTQOR	50	6	7	30	0.13	1175.5	0
TQUARTIC	100	12	13	35	0.27	2.7682e-11	0
TQUARTIC	5	1	2	2	0.04	4.4373e-31	0
TQUARTIC	50	10	11	35	0.20	5.2793e-13	0
TQUARTIC	500	15	16	42	0.76	4.787e-15	0
TRIDIA	10	1	2	2	0.04	1.0805e-30	0
TRIDIA	100	2	3	3	0.09	1.352e-32	0
TRIDIA	50	2	3	3	0.07	1.352e-32	0
TRIDIA	500	2	3	3	0.28	1.3482e-32	0
VARDIM	10	14	15	14	0.23	1.595e-26	0
VARDIM	100	25	26	25	0.59	5.171e-26	0
VARDIM	50	22	23	22	0.40	1.2641e-27	0
VARDIM	500	33	34	33	5.13	1.1634e-25	0
VAREIGVL	10	36	37	156	0.59	7.2928e-12	0
VAREIGVL	100	12	13	84	0.40	3.3727e-09	0

Table 150: NMTR1 with band preconditioning and $p = 40$ on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.31	2.9295e-10	0
VAREIGVL	500	12	13	63	1.61	2.0175e-08	0
VIBRBEAM	8	31	32	104	0.71	0.15647	3
WATSON	12	8	9	44	0.22	7.76e-08	0
WATSON	31	10	11	57	0.37	5.0956e-08	0
WOODS	100	15	16	28	0.33	2.0135e-17	0
WOODS	4	15	16	28	0.24	8.0539e-19	0
WOODS	500	16	17	31	0.75	9.8289e-15	0
YFITU	3	37	38	73	0.57	1.9632e-08	0
ZANGWIL2	2	1	2	1	0.02	-18.2	0
PFIT2LS	3	52	53	86	0.76	2.9525e-11	0
PFIT3LS	3	39	40	65	0.57	4.0587e-11	0
PFIT4LS	3	68	69	111	0.99	7.824e-13	0
EXTROSNB	10	130	131	287	1.91	1.3752e-08	0
EXTROSNB	50	465	466	929	7.71	1.49e-07	0
EXTROSNB	100	451	452	901	8.28	1.455e-07	0

Table 151: NMTR1 with band preconditioning and $p = 40$ on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.74	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.17	1.11e-12	0
BDQRTIC	1000	11	12	24	1.61	3983.8	0
BROYDN7D	1000	63	64	151	5.36	345.54	0
BRYBND	1000	16	17	46	2.53	1.8775e-12	0
BRYBND	5000	24	25	74	18.80	2.3487e-13	0
CRAGGLVY	1000	14	15	25	1.53	336.42	0
EIGENBLS	110	71	72	992	7.70	1.7454e-09	0
DIXMAANA	1500	5	6	15	0.96	1	0
DIXMAANA	3000	5	6	15	1.92	1	0
DIXMAANB	1500	7	8	14	1.13	1	0
DIXMAANB	3000	7	8	14	2.19	1	0
DIXMAANC	1500	17	18	28	2.01	1	0
DIXMAANC	3000	14	15	27	3.86	1	0
DIXMAAND	1500	9	10	21	1.33	1	0
DIXMAAND	3000	11	12	24	2.90	1	0
DIXMAANE	1500	6	7	17	1.05	1	0
DIXMAANE	3000	6	7	17	2.08	1	0
DIXMAANF	1500	25	26	46	2.80	1	0
DIXMAANF	3000	43	44	81	8.33	1	0
DIXMAANG	1500	38	39	78	4.00	1	0
DIXMAANG	3000	57	58	109	10.66	1	0
DIXMAANH	1500	50	51	101	4.97	1	0
DIXMAANH	3000	65	66	125	12.36	1	0
DIXMAANI	1500	7	8	23	1.17	1	0
DIXMAANI	3000	7	8	29	2.49	1	0
DIXMAANJ	1500	91	92	206	8.32	1	0
DIXMAANJ	3000	35	36	86	7.30	1	0
DIXMAANK	1500	62	63	125	5.77	1	0
DIXMAANK	3000	32	33	69	6.53	1	0
DIXMAANL	1500	47	48	284	6.81	1	0
DIXMAANL	3000	57	58	122	11.06	1	0
DQDRTIC	1000	2	3	2	0.41	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.98	1.6602e-23	0
DQRTIC	1000	35	36	62	2.36	3.6952e-06	0
DQRTIC	5000	42	43	73	12.91	7.0042e-06	0
EDENSCH	2000	12	13	21	2.44	12003	0
EIGENALS	930	43	44	160	80.32	2.5686e-11	0
EIGENBLS	930	255	256	11133	1735.09	1.6697e-07	0
ENGVAL1	1000	7	8	14	0.82	1108.2	0
ENGVAL1	5000	7	8	14	3.92	5548.7	0
FLETCBV2	1000	0	1	0	0.33	-0.50134	0

Table 152: NMTR1 with band preconditioning and $p = 40$ on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1002.17	-1.8877e+06	1
FMINSURF	1024	294	295	793	99.55	1	0
FMINSURF	5625	352	353	1032	2748.65	1	0
FREUROTH	1000	10	11	17	1.08	121470	0
FREUROTH	5000	10	11	17	5.12	608160	0
LIARWHD	1000	14	15	35	1.27	2.0274e-20	0
LIARWHD	5000	13	14	28	5.69	6.0958e-16	0
MOREBV	1000	1	2	2	0.39	7.3289e-13	0
MOREBV	5000	1	2	2	1.86	5.8478e-15	0
MSQRTALS	1024	37	38	4622	668.61	9.7882e-09	0
MSQRTALS	529	21	22	1985	89.00	4.0963e-08	0
MSQRTBLS	529	35	36	4165	178.21	2.6906e-08	0
MSQRTBLS	1024	24	25	2024	315.14	4.5054e-09	0
NCB20B	1000	22	23	590	50.76	1676	0
NONDIA	1000	23	24	58	1.78	4.1197e-12	0
NONDIA	5000	32	33	80	10.97	5.0265e-15	0
NONDIA	10000	33	34	81	22.81	1.2547e-07	0
NONDQUAR	1000	17	18	36	1.23	1.3932e-09	0
NONDQUAR	5000	18	19	37	5.81	1.0076e-09	0
NONDQUAR	10000	19	20	38	12.27	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	58	59	577	22.49	0.0096875	0
POWELLSG	1000	15	16	30	1.06	2.2324e-06	0
POWELLSG	5000	15	16	32	4.85	5.2976e-06	0
POWELLSG	10000	15	16	32	9.96	1.0595e-05	0
POWER	1000	27	28	80	7.62	1.8888e-08	0
QUARTC	1000	35	36	62	2.40	3.6952e-06	0
QUARTC	5000	42	43	73	12.94	7.0042e-06	0
QUARTC	10000	45	46	78	27.49	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.71	-2994	0
SCHMVETT	5000	3	4	6	3.50	-14994	0
SCHMVETT	10000	3	4	6	6.97	-29994	0
SINQUAD	1000	55	56	170	6.34	1.5526e-08	0
SINQUAD	5000	77	78	222	61.50	2.7421e-08	0
SINQUAD	10000	87	88	254	157.95	2.4936e-08	0
SPMSRTLS	1000	25	26	53	3.37	5.6048e-16	0
SPMSRTLS	4999	27	28	55	17.76	3.0578e-11	0
SPMSRTLS	10000	44	45	96	54.48	3.311e-13	0
SROSENBR	1000	10	11	20	0.82	5.8309e-13	0
SROSENBR	5000	10	11	20	3.89	2.9154e-12	0
SROSENBR	10000	10	11	20	7.83	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.59	7.6524e-11	0

Table 153: NMTR1 with band preconditioning and $p = 40$ on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.45	10	0
TOINTGSS	5000	2	3	4	2.13	10	0
TOINTGSS	10000	2	3	4	4.27	10	0
TQUARTIC	1000	12	13	36	1.20	2.9487e-11	0
TQUARTIC	5000	20	21	51	10.19	1.1107e-10	0
TQUARTIC	10000	18	19	44	23.35	3.5718e-15	0
TRIDIA	1000	2	3	3	0.49	1.3827e-32	0
TRIDIA	5000	2	3	3	2.24	4.1976e-33	0
TRIDIA	10000	2	3	3	4.61	5.3451e-33	0
VARDIM	1000	36	37	36	18.89	1.1203e-20	0
VARDIM	5000	45	46	45	548.51	1.1459e-18	0
VAREIGVL	1000	12	13	70	4.49	5.6139e-08	0
VAREIGVL	5000	13	14	59	83.90	7.7013e-08	0
WOODS	1000	16	17	31	1.26	1.9658e-14	0
WOODS	10000	16	17	31	12.31	1.9658e-13	0
FLETCHCR	1000	1321	1322	2642	81.17	1.5315e-20	0
GENROSE	1000	506	507	1120	29.70	1	0

Table 154: NMTR1 with band preconditioning and $p = 40$ on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	77	78	3267	19.52	0	0
CATENARY	501	713	714	14478	77.64	-348400	0
CHANDHEQ	100	13	14	62	6.85	6.7959e-08	0
CHEMRCTA	100	36	37	608	1.28	5.102e-15	0
CHEMRCTB	1000	52	53	165	6.41	6.1367e-20	0
CLPLATEC	5041	3	4	3935	200.50	-0.0050207	0
CORKSCRW	456	129	130	76738	223.85	26.484	0
DALLASM	196	82	83	15783	25.28	-48198	0
DISCS	36	141	142	4265	8.17	12	0
DRUGDIS	304	211	212	3821	19.38	4.2452	0
DTOC5	9999	25	26	91	46.64	1.5316	0
EXPFITB	5	62	63	902	2.57	0.0050193	0
EXPFITC	5	84	85	1696	13.83	0.023303	0
FCCU	19	16	17	57	0.34	11.149	0
FLETCHER	4	31	32	64	0.50	19.525	0
GILBERT	500	29	30	71	3.46	237.37	0
GRIDNETA	3444	35	36	3753	90.76	161.61	0
GRIDNETE	3444	27	28	2939	107.21	144.06	0
HADAMARD	257	304	305	22628	288.90	1	0
HAGER3	2001	12	13	32	4.11	0.14096	0
HAGER4	2001	11	12	2294	46.57	2.7942	0
HS114	10	738	739	4444	11.22	-1768.8	0
HS59	2	230	231	462	3.38	-7.8028	0
HS75	4	136	137	546	2.01	5174.4	0
HVYCRASH	204	228	229	2376	10.36	-0.2185	0
HYDROELL	1009	143	144	22557	256.20	-3.5855e+06	0
JUNKTURN	5010	79	80	1332	106.63	9.3903e-06	0
KSIP	20	69	70	3794	67.89	0.57579	0
LINVERSE	1999	25	26	963	43.85	681	0
LMINSURF	1024	358	359	919	33.88	9	0
MANNE	300	6	7	75	0.97	-0.97457	0
MEYER3	3	73	74	158	1.06	87.946	0
MINPERM	51	18	19	141	0.53	0.0384	0
MISTAKE	9	32	33	215	0.59	-1	0
NGONE	50	1134	1135	31185	163.13	-0.64103	0
NLMSURF	1024	1020	1021	2888	99.71	38.591	0
NYSTROM5	18	28	29	453	0.65	2.4426e-05	0
ODC	10404	19	20	916	144.63	-0.0040122	0
OET1	3	38	39	974	13.47	0.53824	0
OPTCTRL3	122	61	62	249	1.71	2048	0
ORTHREGA	2053	172	173	897	60.28	5661.4	0
ORTHREGC	5005	57	58	415	65.18	94.813	0

Table 155: NMTR1 with band preconditioning and $p = 40$ on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	446	447	2170	11.63	15.59	0
ORTHREGF	1205	180	181	428	21.52	18.582	0
PRODPL1	60	65	66	1323	1.76	35.739	0
QR3D	610	123	124	13934	398.64	1.1139e-08	0
QR3DBD	457	122	123	1770	51.68	2.1558e-10	0
READING1	202	765	766	16215	50.45	-0.16049	0
SEMICON1	102	481	482	986	16.22	8.4861e-16	0
SEMICON2	1002	134	135	261	29.39	1.6734e-06	0
SIPOW1	2	40	41	1239	31.92	-1	0
SPANHYD	97	36	37	754	1.30	239.74	0
SSC	10404	1	2	93	28.59	-2.0782	0
SSEBNLN	194	67	68	1430	3.32	1.6171e+07	0
SSNLBEAM	3003	239	240	7246	273.95	340.03	0
STEENBRE	540	743	744	39509	84.56	27459	0
TENBARS1	18	467	468	5852	8.66	2295.4	0
TENBARS2	18	193	194	1456	3.35	2277.9	0
TRAINF	408	43	44	1275	5.35	3.0975	0
TRUSPYR1	11	436	437	2145	7.01	11.228	0
UBH5	1010	80	81	22512	140.98	1.1163	0
WATER	31	42	43	396	0.82	10549	0
ZIGZAG	304	89	90	17835	43.71	33.787	0

Table 156: NMTR1 with band preconditioning and $p = 40$ on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.14	5.7444	0
ARWHEAD	100	5	6	7	0.14	0	0
ARWHEAD	500	5	6	6	0.38	1.3237e-09	0
BARD	3	7	8	13	0.12	0.0082149	0
BDQRTIC	100	11	12	23	0.30	378.77	0
BDQRTIC	500	11	12	24	0.82	1981	0
BEALE	2	7	8	14	0.11	2.9425e-14	0
BIGGS6	6	122	123	265	1.79	1.3181e-09	0
BOX3	3	7	8	13	0.12	1.9221e-11	0
BRKMCC	2	3	4	5	0.06	0.16904	0
BROWNAL	10	5	6	42	0.11	9.2726e-11	0
BROWNBS	2	34	35	50	0.53	0	0
BROWNDEN	4	11	12	20	0.19	85822	0
BROYDN7D	10	16	17	32	0.26	1.2611	0
BROYDN7D	100	30	31	65	0.65	29.362	0
BROYDN7D	500	48	49	109	2.33	169.56	0
BRYBND	10	11	12	36	0.19	7.2241e-15	0
BRYBND	100	12	13	38	0.38	1.3572e-12	0
BRYBND	500	15	16	43	1.26	1.7435e-13	0
CHNROSNB	10	25	26	50	0.37	4.308e-21	0
CLIFF	2	27	28	30	0.42	0.19979	0
CRAGGLVY	100	14	15	25	0.35	32.27	0
CRAGGLVY	4	16	17	30	0.26	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.84	167.45	0
CUBE	2	32	33	59	0.44	7.6271e-15	0
DENSCHNA	2	5	6	9	0.10	1.2e-15	0
DENSCHNB	2	3	4	5	0.07	0	0
DENSCHNC	2	9	10	13	0.15	1.8423e-13	0
DENSCHND	3	33	34	63	0.49	8.6576e-09	0
DENSCHNE	3	11	12	16	0.18	2.4642e-12	0
DENSCHNF	2	6	7	12	0.11	6.5139e-22	0
DIXMAANA	15	5	6	9	0.07	1	0
DIXMAANA	90	5	6	14	0.12	1	0
DIXMAANA	300	5	6	14	0.23	1	0
DIXMAANB	15	6	7	11	0.09	1	0
DIXMAANB	90	8	9	18	0.15	1	0
DIXMAANB	300	7	8	13	0.26	1	0
DIXMAANC	15	9	10	15	0.10	1	0
DIXMAANC	90	9	10	16	0.18	1	0
DIXMAANC	300	11	12	20	0.38	1	0
DIXMAAND	15	9	10	16	0.11	1	0
DIXMAAND	90	10	11	21	0.19	1	0

Table 157: NMTR1 with band preconditioning and $p = \infty$ on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.39	1	0
DIXMAANE	15	6	7	12	0.09	1	0
DIXMAANE	90	6	7	16	0.14	1	0
DIXMAANE	300	6	7	16	0.25	1	0
DIXMAANF	15	10	11	20	0.11	1	0
DIXMAANF	90	10	11	21	0.18	1	0
DIXMAANF	300	47	48	99	1.22	1	0
DIXMAANG	15	11	12	22	0.12	1	0
DIXMAANG	90	16	17	33	0.27	1	0
DIXMAANG	300	24	25	47	0.72	1	0
DIXMAANH	15	13	14	26	0.14	1	0
DIXMAANH	90	19	20	40	0.30	1	0
DIXMAANH	300	26	27	49	0.74	1	0
DIXMAANI	15	5	6	11	0.07	1	0
DIXMAANI	90	6	7	15	0.12	1	0
DIXMAANI	300	6	7	15	0.25	1	0
DIXMAANJ	15	12	13	24	0.13	1	0
DIXMAANJ	90	20	21	42	0.31	1	0
DIXMAANJ	300	21	22	43	0.66	1	0
DIXMAANK	15	16	17	32	0.17	1	0
DIXMAANK	90	18	19	37	0.30	1	0
DIXMAANK	300	37	38	75	1.01	1	0
DIXMAANL	15	15	16	29	0.16	1	0
DIXMAANL	90	32	33	66	0.48	1	0
DIXMAANL	300	51	52	102	1.29	1	0
DIXON3DQ	10	2	3	4	0.05	0	0
DJTL	2	135	136	185	1.86	-8951.5	0
DQDRTIC	10	2	3	2	0.05	1.6602e-23	0
DQDRTIC	100	2	3	2	0.08	1.6602e-23	0
DQDRTIC	500	2	3	2	0.22	1.6602e-23	0
DQRTIC	100	26	27	47	0.51	4.5801e-07	0
DQRTIC	500	33	34	59	1.33	5.8379e-07	0
EDENSCH	36	12	13	21	0.23	219.28	0
EIGENALS	110	20	21	70	1.04	1.022e-10	0
EIGENALS	420	35	36	120	14.69	1.7732e-11	0
EIGENBLS	110	71	72	992	7.76	1.7454e-09	0
EIGENBLS	420	120	121	5557	232.83	1.0499e-08	0
EIGENCLS	462	181	182	1965	168.76	6.1336e-10	0
ENGVAL1	100	7	8	14	0.18	109.09	0
ENGVAL1	2	7	8	12	0.10	0	0
ERRINROS	10	46	47	85	0.66	6.6946	0
ERRINROS	50	50	51	97	0.83	39.904	0

Table 158: NMTR1 with band preconditioning and $p = \infty$ on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.20	0.24051	0
EXTROSNB	5	34	35	67	0.50	1.0288e-12	0
FLETCBV2	100	1	2	2	0.07	-0.51401	0
FLETCBV3	100	10000	10001	20356	226.57	-1656.3	1
FLETCHBV	10	320	321	592	4.48	-2.0742e+06	0
FLETCHBV	100	—	—	—	—	—	6
FLETCHCR	10	26	27	52	0.39	2.0952e-18	0
FLETCHCR	100	144	145	288	2.78	1.1673e-17	0
FMINSURF	121	87	88	223	2.53	1	0
FMINSURF	16	17	18	35	0.29	1	0
FREUROTH	100	10	11	17	0.25	11965	0
FREUROTH	2	9	10	14	0.15	48.984	0
FREUROTH	50	10	11	17	0.20	5881	0
FREUROTH	500	10	11	17	0.58	60634	0
GENROSE	10	30	31	58	0.47	1	0
GENROSE	100	65	66	149	1.26	1	0
GENROSE	500	264	265	574	9.46	1	0
GROWTHLS	3	73	74	122	1.10	1.004	0
GULF	3	31	32	59	0.65	2.5375e-14	0
HAIRY	2	62	63	100	0.58	20	0
HATFLDD	3	19	20	37	0.30	6.6151e-08	0
HATFLDE	3	22	23	43	0.36	5.1204e-07	0
HEART6LS	6	661	662	1401	10.01	2.2089e-09	0
HELIX	3	12	13	23	0.20	2.9584e-13	0
HILBERTA	2	2	3	2	0.04	6.656e-31	0
HILBERTB	5	2	3	2	0.03	1.5953e-29	0
HIMMELBB	2	12	13	15	0.19	2.0444e-23	0
HIMMELBF	4	45	46	147	0.73	318.57	0
HIMMELBG	2	8	9	11	0.09	5.1108e-17	0
HIMMELBH	2	1	2	1	0.03	-1	0
HYDC20LS	0	—	—	—	—	—	6
JENSMP	2	9	10	14	0.14	124.36	0
KOWOSB	4	10	11	20	0.15	0.0003078	0
LIARWHD	100	13	14	37	0.31	9.0888e-21	0
LIARWHD	36	10	11	32	0.19	1.1625e-16	0
LIARWHD	500	15	16	36	0.80	3.7352e-14	0
LOGROS	2	38	39	54	0.54	6.0976e-12	0
MANCINO	100	15	16	23	17.60	9.2449e-18	0
MOREBV	10	2	3	4	0.06	6.582e-14	0
MOREBV	100	1	2	2	0.07	7.887e-10	0
MOREBV	500	1	2	2	0.20	5.9316e-12	0
MSQRTALS	100	17	18	245	1.59	5.5682e-10	0

Table 159: NMTR1 with band preconditioning and $p = \infty$ on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.23	6.2623e-12	0
MSQRTALS	49	19	20	143	0.60	1.3997e-10	0
MSQRTBLS	100	24	25	379	2.27	4.8675e-10	0
MSQRTBLS	49	17	18	161	0.58	2.0502e-10	0
MSQRTBLS	9	13	14	36	0.21	4.8784e-11	0
NCB20B	100	22	23	931	5.43	196.68	0
NCB20B	50	26	27	651	1.79	99.504	0
NCB20B	500	21	22	727	30.09	897.52	0
NONDIA	100	19	20	47	0.40	2.898e-15	0
NONDIA	50	19	20	48	0.33	6.6466e-13	0
NONDIA	500	18	19	42	0.88	2.4158e-10	0
NONDQUAR	100	15	16	37	0.34	2.2854e-09	0
NONDQUAR	500	16	17	36	0.71	3.9386e-09	0
NONMSQRT	100	—	—	—	—	—	6
NONMSQRT	49	—	—	—	—	—	6
NONMSQRT	9	63	64	168	0.95	0.75193	0
OSBORNEA	5	40	41	92	0.65	5.4679e-05	0
OSBORNEB	11	19	20	78	0.55	0.040138	0
PALMER1C	8	20	21	174	0.38	0.097605	0
PALMER1D	7	14	15	56	0.24	0.65267	0
PALMER2C	8	19	20	200	0.33	0.014369	0
PALMER3C	8	11	12	78	0.21	0.019539	0
PALMER4C	8	24	25	215	0.43	0.050312	0
PENALTY1	10	43	44	187	0.63	7.098e-05	0
PENALTY1	100	53	54	653	1.53	0.00090254	0
PENALTY1	50	50	51	491	1.00	0.0004318	0
PENALTY1	500	59	60	632	7.89	0.0047793	0
PENALTY2	10	69	70	240	1.03	0.00029386	0
PENALTY2	100	19	20	87	0.57	97096	0
PENALTY2	50	30	31	154	0.63	4.2961	0
PENALTY3	100	22	23	55	20.07	0.001	0
PENALTY3	50	21	22	56	3.96	0.001	0
PFIT1LS	3	85	86	157	1.19	6.3463e-09	0
POWELLSG	100	15	16	30	0.32	2.1902e-07	0
POWELLSG	500	15	16	30	0.65	1.1139e-06	0
POWELLSG	20	15	16	30	0.26	4.0054e-08	0
POWELLSG	4	15	16	30	0.24	4.2527e-09	0
POWER	10	16	17	40	0.25	1.1098e-08	0
POWER	100	22	23	66	0.49	5.0264e-09	0
POWER	50	19	20	54	0.35	2.3411e-08	0
POWER	500	26	27	78	2.42	5.9786e-09	0
QUARTC	100	26	27	47	0.52	4.5801e-07	0

Table 160: NMTR1 with band preconditioning and $p = \infty$ on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.34	5.2022e-08	0
QUARTC	500	33	34	59	1.37	5.8379e-07	0
ROSENBR	2	26	27	45	0.36	3.2328e-13	0
S308	2	10	11	16	0.16	0.7732	0
SCHMVETT	10	3	4	6	0.05	-24	0
SCHMVETT	500	3	4	6	0.37	-1494	0
SCHMVETT	3	3	4	6	0.05	-3	0
SCHMVETT	500	3	4	6	0.36	-1494	0
SINQUAD	100	40	41	140	0.95	4.1555e-08	0
SINQUAD	5	11	12	22	0.18	1.1721e-08	0
SINQUAD	50	33	34	124	0.65	1.4352e-07	0
SINQUAD	500	51	52	158	3.00	1.9161e-08	0
SISSER	2	12	13	19	0.19	1.1139e-08	0
SNAIL	2	65	66	117	0.63	1.6803e-13	0
SPMSRTLS	100	14	15	26	0.38	3.2303e-13	0
SPMSRTLS	28	12	13	22	0.21	3.2953e-16	0
SPMSRTLS	499	20	21	39	1.50	1.9096e-16	0
SROSENBR	10	6	7	10	0.11	4.6748e-17	0
SROSENBR	100	6	7	10	0.15	4.6748e-16	0
SROSENBR	50	6	7	10	0.13	2.3374e-16	0
SROSENBR	500	10	11	20	0.48	2.9154e-13	0
TOINTGOR	50	9	10	84	0.21	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.07	10	0
TOINTGSS	50	2	3	4	0.06	10	0
TOINTGSS	500	2	3	4	0.24	10	0
TOINTPSP	50	23	24	88	0.44	225.56	0
TOINTQOR	50	6	7	30	0.13	1175.5	0
TQUARTIC	100	12	13	35	0.28	2.7682e-11	0
TQUARTIC	5	1	2	2	0.04	4.4373e-31	0
TQUARTIC	50	10	11	35	0.19	5.2793e-13	0
TQUARTIC	500	15	16	42	0.74	4.787e-15	0
TRIDIA	10	1	2	2	0.04	1.0805e-30	0
TRIDIA	100	2	3	3	0.08	1.352e-32	0
TRIDIA	50	2	3	3	0.08	1.352e-32	0
TRIDIA	500	2	3	3	0.26	1.3482e-32	0
VARDIM	10	14	15	14	0.23	1.595e-26	0
VARDIM	100	25	26	25	0.59	5.171e-26	0
VARDIM	50	22	23	22	0.40	1.2641e-27	0
VARDIM	500	33	34	33	4.96	1.1634e-25	0
VAREIGVL	10	36	37	156	0.56	7.2928e-12	0
VAREIGVL	100	12	13	84	0.38	3.3727e-09	0

Table 161: NMTR1 with band preconditioning and $p = \infty$ on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.29	2.9295e-10	0
VAREIGVL	500	12	13	63	1.58	2.0175e-08	0
VIBRBEAM	8	31	32	104	0.69	0.15647	3
WATSON	12	8	9	44	0.22	7.76e-08	0
WATSON	31	10	11	57	0.36	5.0956e-08	0
WOODS	100	15	16	28	0.31	2.0135e-17	0
WOODS	4	15	16	28	0.23	8.0539e-19	0
WOODS	500	16	17	31	0.74	9.8289e-15	0
YFITU	3	37	38	73	0.56	1.9632e-08	0
ZANGWIL2	2	1	2	1	0.03	-18.2	0
PFIT2LS	3	52	53	86	0.74	2.9525e-11	0
PFIT3LS	3	39	40	65	0.55	4.0587e-11	0
PFIT4LS	3	128	129	222	1.69	1.2057e-09	0
EXTROSNB	10	75	76	156	1.08	1.1572e-07	0
EXTROSNB	50	78	79	155	1.28	6.0631e-07	0
EXTROSNB	100	70	71	139	1.42	8.7683e-07	0

Table 162: NMTR1 with band preconditioning and $p = \infty$ on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.71	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.02	1.11e-12	0
BDQRTIC	1000	11	12	24	1.56	3983.8	0
BROYDN7D	1000	63	64	151	5.28	345.54	0
BRYBND	1000	16	17	46	2.49	1.8775e-12	0
BRYBND	5000	24	25	74	18.33	2.3487e-13	0
CRAGGLVY	1000	14	15	25	1.52	336.42	0
CRAGGLVY	5000	14	15	26	7.34	1688.2	0
DIXMAANA	1500	5	6	15	0.92	1	0
DIXMAANA	3000	5	6	15	1.83	1	0
DIXMAANB	1500	7	8	14	1.06	1	0
DIXMAANB	3000	7	8	14	2.12	1	0
DIXMAANC	1500	17	18	28	1.96	1	0
DIXMAANC	3000	14	15	27	3.56	1	0
DIXMAAND	1500	9	10	21	1.26	1	0
DIXMAAND	3000	11	12	24	2.82	1	0
DIXMAANE	1500	6	7	17	1.02	1	0
DIXMAANE	3000	6	7	17	2.02	1	0
DIXMAANF	1500	25	26	46	2.73	1	0
DIXMAANF	3000	43	44	81	8.17	1	0
DIXMAANG	1500	38	39	78	3.85	1	0
DIXMAANG	3000	57	58	109	10.56	1	0
DIXMAANH	1500	50	51	101	4.88	1	0
DIXMAANH	3000	75	76	146	13.92	1	0
DIXMAANI	1500	7	8	23	1.12	1	0
DIXMAANI	3000	7	8	29	2.40	1	0
DIXMAANJ	1500	88	89	198	7.86	1	0
DIXMAANJ	3000	35	36	86	7.19	1	0
DIXMAANK	1500	62	63	125	5.66	1	0
DIXMAANK	3000	32	33	69	6.38	1	0
DIXMAANL	1500	47	48	284	6.66	1	0
DIXMAANL	3000	57	58	122	10.90	1	0
DQDRTIC	1000	2	3	2	0.38	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.79	1.6602e-23	0
DQRTIC	1000	35	36	62	2.41	3.6952e-06	0
DQRTIC	5000	42	43	73	12.99	7.0042e-06	0
EDENSCH	2000	12	13	21	2.39	12003	0
EIGENALS	930	43	44	160	79.31	2.5686e-11	0
EIGENBLS	930	251	252	29943	3822.55	1.621e-07	0
ENGVAL1	1000	7	8	14	0.80	1108.2	0
ENGVAL1	5000	7	8	14	3.79	5548.7	0
FLETCBV2	1000	0	1	0	0.31	-0.50134	0

Table 163: NMTR1 with band preconditioning and $p = \infty$ on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1059.65	-1.8877e+06	1
FMINSURF	1024	381	382	869	126.49	1	0
FMINSURF	5625	224	225	686	1726.19	1	0
FREUROTH	1000	10	11	17	1.05	121470	0
FREUROTH	5000	10	11	17	4.99	608160	0
LIARWHD	1000	14	15	35	1.26	2.0274e-20	0
LIARWHD	5000	13	14	28	5.55	6.0958e-16	0
MOREBV	1000	1	2	2	0.37	7.3289e-13	0
MOREBV	5000	1	2	2	1.76	5.8478e-15	0
MSQRTALS	1024	37	38	4622	615.03	9.7882e-09	0
MSQRTALS	529	21	22	1985	87.37	4.0963e-08	0
MSQRTBLS	529	35	36	4165	175.08	2.6906e-08	0
MSQRTBLS	1024	24	25	2024	291.21	4.5054e-09	0
NCB20B	1000	22	23	590	49.87	1676	0
NONDIA	1000	23	24	58	1.76	4.1197e-12	0
NONDIA	5000	32	33	80	10.82	5.0265e-15	0
NONDIA	10000	33	34	81	22.45	1.2547e-07	0
NONDQUAR	1000	17	18	36	1.24	1.3932e-09	0
NONDQUAR	5000	18	19	37	5.69	1.0076e-09	0
NONDQUAR	10000	19	20	38	12.02	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	58	59	577	22.60	0.0096875	0
POWELLSG	1000	15	16	30	1.06	2.2324e-06	0
POWELLSG	5000	15	16	32	4.73	5.2976e-06	0
POWELLSG	10000	15	16	32	9.80	1.0595e-05	0
POWER	1000	27	28	80	7.54	1.8888e-08	0
QUARTC	1000	35	36	62	2.42	3.6952e-06	0
QUARTC	5000	42	43	73	12.87	7.0042e-06	0
QUARTC	10000	45	46	78	27.49	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.70	-2994	0
SCHMVETT	5000	3	4	6	3.43	-14994	0
SCHMVETT	10000	3	4	6	6.86	-29994	0
SINQUAD	1000	55	56	170	6.24	1.5526e-08	0
SINQUAD	5000	77	78	222	63.53	2.7421e-08	0
SINQUAD	10000	87	88	254	161.69	2.4936e-08	0
SPMSRTLS	1000	25	26	53	3.40	5.6048e-16	0
SPMSRTLS	4999	27	28	55	17.61	3.0578e-11	0
SPMSRTLS	10000	44	45	96	54.28	3.311e-13	0
SROSENBR	1000	10	11	20	0.85	5.8309e-13	0
SROSENBR	5000	10	11	20	3.72	2.9154e-12	0
SROSENBR	10000	10	11	20	7.56	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.56	7.6524e-11	0

Table 164: NMTR1 with band preconditioning and $p = \infty$ on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.43	10	0
TOINTGSS	5000	2	3	4	2.02	10	0
TOINTGSS	10000	2	3	4	4.03	10	0
TQUARTIC	1000	12	13	36	1.18	2.9487e-11	0
TQUARTIC	5000	20	21	51	10.36	1.1107e-10	0
TQUARTIC	10000	18	19	44	24.05	3.5718e-15	0
TRIDIA	1000	2	3	3	0.49	1.3827e-32	0
TRIDIA	5000	2	3	3	2.29	4.1976e-33	0
TRIDIA	10000	2	3	3	4.37	5.3451e-33	0
VARDIM	1000	36	37	36	18.71	1.1203e-20	0
VARDIM	5000	45	46	45	547.23	1.1459e-18	0
VAREIGVL	1000	12	13	70	4.44	5.6139e-08	0
VAREIGVL	5000	13	14	59	84.20	7.7013e-08	0
WOODS	1000	16	17	31	1.23	1.9658e-14	0
WOODS	10000	16	17	31	11.81	1.9658e-13	0
FLETCHCR	1000	1321	1322	2642	79.54	1.5315e-20	0
GENROSE	1000	447	448	946	26.49	1	0

Table 165: NMTR1 with band preconditioning and $p = \infty$ on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	77	78	3267	19.23	0	0
CATENARY	501	572	573	13770	69.63	-348400	0
CHANDHEQ	100	13	14	62	6.87	6.7959e-08	0
CHEMRCTA	100	36	37	608	1.33	5.102e-15	0
CHEMRCTB	1000	52	53	165	6.28	6.1367e-20	0
CLPLATEC	5041	3	4	3935	199.55	-0.0050207	0
CORKSCRW	456	129	130	76738	223.41	26.484	0
DALLASM	196	82	83	15783	23.85	-48198	0
DISCS	36	153	154	4598	8.89	12	0
DRUGDIS	304	211	212	3821	19.29	4.2452	0
DTOC5	9999	25	26	91	44.92	1.5316	0
EXPFITB	5	62	63	902	2.49	0.0050193	0
EXPFITC	5	84	85	1696	13.58	0.023303	0
FCCU	19	16	17	57	0.33	11.149	0
FLETCHER	4	31	32	64	0.49	19.525	0
GILBERT	500	29	30	71	3.39	237.37	0
GRIDNETA	3444	35	36	3753	89.02	161.61	0
GRIDNETE	3444	27	28	2939	104.72	144.06	0
HADAMARD	257	304	305	22628	292.08	1	0
HAGER3	2001	12	13	32	4.05	0.14096	0
HAGER4	2001	11	12	2294	46.90	2.7942	0
HS114	10	756	757	4513	11.35	-1768.8	0
HS59	2	195	196	402	2.90	-7.8028	0
HS75	4	137	138	549	2.04	5174.4	0
HVYCRASH	204	228	229	2378	10.14	-0.2185	0
HYDROELL	1009	143	144	22557	254.48	-3.5855e+06	0
JUNKTURN	5010	79	80	1332	105.96	9.3903e-06	0
KSIP	20	69	70	3794	65.49	0.57579	0
LINVERSE	1999	25	26	963	43.77	681	0
LMINSURF	1024	365	366	935	34.19	9	0
MANNE	300	6	7	75	0.95	-0.97457	0
MEYER3	3	73	74	158	1.06	87.946	0
MINPERM	51	18	19	141	0.51	0.0384	0
MISTAKE	9	32	33	215	0.57	-1	0
NGONE	50	1134	1135	31185	164.49	-0.64103	0
NLMSURF	1024	1189	1190	3139	112.25	38.591	0
NYSTROM5	18	28	29	453	0.63	2.4426e-05	0
ODC	10404	19	20	916	145.01	-0.0040122	0
OET1	3	38	39	974	13.23	0.53824	0
OPTCTRL3	122	61	62	249	1.67	2048	0
ORTHREGA	2053	172	173	897	62.60	5661.4	0
ORTHREGC	5005	57	58	415	65.73	94.813	0

Table 166: NMTR1 with band preconditioning and $p = \infty$ on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	113	114	685	3.22	15.59	0
ORTHREGF	1205	240	241	573	30.08	23.707	0
PRODPL1	60	58	59	1064	1.52	35.739	0
QR3D	610	123	124	13934	397.23	1.1139e-08	0
QR3DBD	457	122	123	1770	50.92	2.1558e-10	0
READING1	202	774	775	17292	50.78	-0.16049	0
SEMICON1	102	398	399	803	13.17	7.0312e-16	0
SEMICON2	1002	134	135	261	29.03	1.6734e-06	0
SIPOW1	2	40	41	1239	31.52	-1	0
SPANHYD	97	23	24	483	0.91	239.74	0
SSC	10404	1	2	93	28.49	-2.0782	0
SSEBNLN	194	65	66	1468	3.32	1.6171e+07	0
SSNLBEAM	3003	239	240	7246	273.96	340.03	0
STEENBRE	540	3424	3425	127435	278.54	27465	0
TENBARS1	18	354	355	4638	6.69	2295.4	0
TENBARS2	18	192	193	1484	3.29	2277.9	0
TRAINF	408	43	44	1275	5.38	3.0975	0
TRUSPYR1	11	403	404	1800	6.50	11.228	0
UBH5	1010	80	81	22512	141.08	1.1163	0
WATER	31	39	40	365	0.76	10549	0
ZIGZAG	304	89	90	17835	43.04	33.787	0

Table 167: NMTR1 with band preconditioning and $p = \infty$ on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.14	5.7444	0
ARWHEAD	100	5	6	7	0.15	0	0
ARWHEAD	500	5	6	6	0.38	1.3237e-09	0
BARD	3	7	8	13	0.12	0.0082149	0
BDQRTIC	100	11	12	23	0.29	378.77	0
BDQRTIC	500	11	12	24	0.82	1981	0
BEALE	2	7	8	14	0.12	2.9425e-14	0
BIGGS6	6	69	70	145	1.04	1.6361e-11	0
BOX3	3	7	8	13	0.13	1.9221e-11	0
BRKMCC	2	3	4	5	0.07	0.16904	0
BROWNAL	10	5	6	42	0.11	9.2726e-11	0
BROWNBS	2	34	35	50	0.47	0	0
BROWNDEN	4	11	12	20	0.20	85822	0
BROYDN7D	10	16	17	32	0.25	1.2611	0
BROYDN7D	100	29	30	67	0.62	30.492	0
BROYDN7D	500	48	49	109	2.35	169.56	0
BRYBND	10	11	12	36	0.19	7.2241e-15	0
BRYBND	100	12	13	38	0.37	1.3572e-12	0
BRYBND	500	15	16	43	1.27	1.7435e-13	0
CHNROSNB	10	22	23	44	0.34	6.5468e-12	0
CLIFF	2	27	28	30	0.40	0.19979	0
CRAGGLVY	100	14	15	25	0.34	32.27	0
CRAGGLVY	4	16	17	30	0.23	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.85	167.45	0
CUBE	2	32	33	59	0.45	7.6271e-15	0
DENSCHNA	2	5	6	9	0.10	1.2e-15	0
DENSCHNB	2	3	4	5	0.05	0	0
DENSCHNC	2	9	10	13	0.15	1.8423e-13	0
DENSCHND	3	33	34	63	0.48	8.6576e-09	0
DENSCHNE	3	11	12	16	0.18	2.4642e-12	0
DENSCHNF	2	6	7	12	0.10	6.5139e-22	0
DIXMAANA	15	5	6	9	0.07	1	0
DIXMAANA	90	5	6	14	0.11	1	0
DIXMAANA	300	5	6	14	0.24	1	0
DIXMAANB	15	6	7	11	0.08	1	0
DIXMAANB	90	8	9	18	0.16	1	0
DIXMAANB	300	7	8	13	0.28	1	0
DIXMAANC	15	9	10	15	0.11	1	0
DIXMAANC	90	9	10	16	0.17	1	0
DIXMAANC	300	11	12	20	0.39	1	0
DIXMAAND	15	9	10	16	0.11	1	0
DIXMAAND	90	10	11	21	0.19	1	0

Table 168: NMTR2 with band preconditioning and $h = 5$ on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.39	1	0
DIXMAANE	15	6	7	12	0.08	1	0
DIXMAANE	90	6	7	16	0.13	1	0
DIXMAANE	300	6	7	16	0.26	1	0
DIXMAANF	15	10	11	20	0.12	1	0
DIXMAANF	90	10	11	21	0.18	1	0
DIXMAANF	300	37	38	77	1.02	1	0
DIXMAANG	15	11	12	22	0.12	1	0
DIXMAANG	90	16	17	33	0.26	1	0
DIXMAANG	300	29	30	56	0.82	1	0
DIXMAANH	15	13	14	26	0.15	1	0
DIXMAANH	90	19	20	40	0.30	1	0
DIXMAANH	300	26	27	52	0.75	1	0
DIXMAANI	15	5	6	11	0.07	1	0
DIXMAANI	90	6	7	15	0.13	1	0
DIXMAANI	300	6	7	15	0.25	1	0
DIXMAANJ	15	12	13	24	0.13	1	0
DIXMAANJ	90	20	21	42	0.31	1	0
DIXMAANJ	300	21	22	43	0.65	1	0
DIXMAANK	15	16	17	32	0.18	1	0
DIXMAANK	90	18	19	37	0.29	1	0
DIXMAANK	300	28	29	57	0.79	1	0
DIXMAANL	15	15	16	29	0.16	1	0
DIXMAANL	90	24	25	47	0.37	1	0
DIXMAANL	300	43	44	90	1.14	1	0
DIXON3DQ	10	2	3	4	0.05	0	0
DJTL	2	127	128	173	1.69	-8951.5	0
DQDRTIC	10	2	3	2	0.06	1.6602e-23	0
DQDRTIC	100	2	3	2	0.09	1.6602e-23	0
DQDRTIC	500	2	3	2	0.23	1.6602e-23	0
DQRTIC	100	26	27	47	0.51	4.5801e-07	0
DQRTIC	500	33	34	59	1.34	5.8379e-07	0
EDENSCH	36	12	13	21	0.22	219.28	0
EIGENALS	110	20	21	70	1.02	1.022e-10	0
EIGENALS	420	35	36	120	14.72	1.7732e-11	0
EIGENBLS	110	71	72	992	7.33	1.7454e-09	0
EIGENBLS	420	138	139	4254	198.89	6.152e-08	0
EIGENCLS	462	208	209	2621	208.45	7.8602e-10	0
ENGVAL1	100	7	8	14	0.19	109.09	0
ENGVAL1	2	7	8	12	0.12	0	0
ERRINROS	10	46	47	85	0.69	6.6946	0
ERRINROS	50	55	56	102	0.92	39.904	0

Table 169: NMTR2 with band preconditioning and $h = 5$ on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.20	0.24051	0
EXTROSNB	5	34	35	67	0.50	1.0288e-12	0
FLETCBV2	100	1	2	2	0.07	-0.51401	0
FLETCBV3	100	10000	10001	20193	215.44	-3486.3	1
FLETCHBV	10	229	230	415	3.29	-2.2511e+06	0
FLETCHBV	100	10000	10001	14699	224.76	-5.0652e+11	1
FLETCHCR	10	26	27	52	0.39	2.0952e-18	0
FLETCHCR	100	144	145	288	2.70	1.1673e-17	0
FMINSURF	121	77	78	207	2.33	1	0
FMINSURF	16	18	19	37	0.29	1	0
FREUROTH	100	10	11	17	0.25	11965	0
FREUROTH	2	9	10	14	0.14	48.984	0
FREUROTH	50	10	11	17	0.20	5881	0
FREUROTH	500	10	11	17	0.62	60634	0
GENROSE	10	30	31	58	0.45	1	0
GENROSE	100	75	76	164	1.41	1	0
GENROSE	500	255	256	571	9.31	1	0
GROWTHLS	3	73	74	122	1.09	1.004	0
GULF	3	31	32	59	0.64	2.5375e-14	0
HAIRY	2	54	55	83	0.52	20	0
HATFLDD	3	19	20	37	0.30	6.6151e-08	0
HATFLDE	3	22	23	43	0.34	5.1204e-07	0
HEART6LS	6	661	662	1401	9.64	2.2089e-09	0
HELIX	3	12	13	23	0.19	2.9584e-13	0
HILBERTA	2	2	3	2	0.03	6.656e-31	0
HILBERTB	5	2	3	2	0.04	1.5953e-29	0
HIMMELBB	2	12	13	15	0.18	2.0444e-23	0
HIMMELBF	4	45	46	147	0.68	318.57	0
HIMMELBG	2	8	9	11	0.09	5.1108e-17	0
HIMMELBH	2	1	2	1	0.02	-1	0
HYDC20LS	99	10000	10001	1189560	2733.67	0.054069	1
JENSMP	2	9	10	14	0.15	124.36	0
KOWOSB	4	10	11	20	0.16	0.0003078	0
LIARWHD	100	13	14	37	0.32	9.0888e-21	0
LIARWHD	36	10	11	32	0.19	1.1625e-16	0
LIARWHD	500	15	16	36	0.77	3.7352e-14	0
LOGROS	2	38	39	54	0.52	3.6105e-11	0
MANCINO	100	15	16	23	17.70	9.2449e-18	0
MOREBV	10	2	3	4	0.05	6.582e-14	0
MOREBV	100	1	2	2	0.07	7.887e-10	0
MOREBV	500	1	2	2	0.22	5.9316e-12	0
MSQRTALS	100	17	18	245	1.62	5.5682e-10	0

Table 170: NMTR2 with band preconditioning and $h = 5$ on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.23	6.2623e-12	0
MSQRTALS	49	19	20	143	0.61	1.3997e-10	0
MSQRTBLS	100	19	20	255	1.71	1.6921e-09	0
MSQRTBLS	49	17	18	161	0.58	2.0502e-10	0
MSQRTBLS	9	13	14	36	0.22	4.8784e-11	0
NCB20B	100	22	23	931	5.48	196.68	0
NCB20B	50	18	19	458	1.27	99.504	0
NCB20B	500	21	22	727	29.92	897.52	0
NONDIA	100	19	20	47	0.39	2.898e-15	0
NONDIA	50	17	18	40	0.31	4.9376e-13	0
NONDIA	500	18	19	42	0.85	2.4158e-10	0
NONDQUAR	100	15	16	37	0.32	2.2854e-09	0
NONDQUAR	500	16	17	36	0.72	3.9386e-09	0
NONMSQRT	100	10000	10001	2968064	9670.05	18.071	1
NONMSQRT	49	10000	10001	1345236	1603.56	1.076	1
NONMSQRT	9	63	64	168	0.93	0.75193	0
OSBORNEA	5	40	41	92	0.65	5.4679e-05	0
OSBORNEB	11	19	20	78	0.52	0.040138	0
PALMER1C	8	20	21	174	0.38	0.097605	0
PALMER1D	7	14	15	56	0.25	0.65267	0
PALMER2C	8	19	20	200	0.34	0.014369	0
PALMER3C	8	11	12	78	0.21	0.019539	0
PALMER4C	8	24	25	215	0.42	0.050312	0
PENALTY1	10	23	24	69	0.37	7.0993e-05	0
PENALTY1	100	33	34	243	0.90	0.00090254	0
PENALTY1	50	31	32	246	0.65	0.00043182	0
PENALTY1	500	39	40	217	5.04	0.0047791	0
PENALTY2	10	69	70	240	1.07	0.00029386	0
PENALTY2	100	19	20	87	0.58	97096	0
PENALTY2	50	23	24	117	0.50	4.2961	0
PENALTY3	100	22	23	55	20.48	0.001	0
PENALTY3	50	21	22	56	4.02	0.001	0
PFIT1LS	3	94	95	175	1.36	3.4358e-08	0
POWELLSG	100	15	16	30	0.32	2.1902e-07	0
POWELLSG	500	15	16	30	0.64	1.1139e-06	0
POWELLSG	20	15	16	30	0.25	4.0054e-08	0
POWELLSG	4	15	16	30	0.24	4.2527e-09	0
POWER	10	16	17	40	0.25	1.1098e-08	0
POWER	100	22	23	66	0.49	5.0264e-09	0
POWER	50	19	20	54	0.34	2.3411e-08	0
POWER	500	26	27	78	2.46	5.9786e-09	0
QUARTC	100	26	27	47	0.51	4.5801e-07	0

Table 171: NMTR2 with band preconditioning and $h = 5$ on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.34	5.2022e-08	0
QUARTC	500	33	34	59	1.35	5.8379e-07	0
ROSENBR	2	26	27	45	0.38	3.2328e-13	0
S308	2	10	11	16	0.18	0.7732	0
SCHMVETT	10	3	4	6	0.05	-24	0
SCHMVETT	500	3	4	6	0.37	-1494	0
SCHMVETT	3	3	4	6	0.04	-3	0
SCHMVETT	500	3	4	6	0.37	-1494	0
SINQUAD	100	40	41	140	0.94	4.1555e-08	0
SINQUAD	5	11	12	22	0.18	1.1721e-08	0
SINQUAD	50	33	34	124	0.63	1.4352e-07	0
SINQUAD	500	51	52	158	3.01	1.9161e-08	0
SISSER	2	12	13	19	0.19	1.1139e-08	0
SNAIL	2	72	73	129	0.71	3.2287e-13	0
SPMSRTLS	100	14	15	26	0.39	3.2303e-13	0
SPMSRTLS	28	12	13	22	0.22	3.2953e-16	0
SPMSRTLS	499	20	21	39	1.52	1.9096e-16	0
SROSENBR	10	6	7	10	0.11	4.6748e-17	0
SROSENBR	100	6	7	10	0.16	4.6748e-16	0
SROSENBR	50	6	7	10	0.14	2.3374e-16	0
SROSENBR	500	10	11	20	0.49	2.9154e-13	0
TOINTGOR	50	9	10	84	0.21	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.08	10	0
TOINTGSS	50	2	3	4	0.06	10	0
TOINTGSS	500	2	3	4	0.25	10	0
TOINTPSP	50	23	24	88	0.44	225.56	0
TOINTQOR	50	6	7	30	0.14	1175.5	0
TQUARTIC	100	12	13	35	0.27	2.7682e-11	0
TQUARTIC	5	1	2	2	0.04	4.4373e-31	0
TQUARTIC	50	10	11	35	0.20	5.2793e-13	0
TQUARTIC	500	15	16	42	0.76	4.787e-15	0
TRIDIA	10	1	2	2	0.04	1.0805e-30	0
TRIDIA	100	2	3	3	0.09	1.352e-32	0
TRIDIA	50	2	3	3	0.07	1.352e-32	0
TRIDIA	500	2	3	3	0.27	1.3482e-32	0
VARDIM	10	14	15	14	0.22	1.595e-26	0
VARDIM	100	25	26	25	0.61	5.171e-26	0
VARDIM	50	22	23	22	0.40	1.2641e-27	0
VARDIM	500	33	34	33	5.03	1.1634e-25	0
VAREIGVL	10	36	37	156	0.56	7.2928e-12	0
VAREIGVL	100	12	13	84	0.38	3.3727e-09	0

Table 172: NMTR2 with band preconditioning and $h = 5$ on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.29	2.9295e-10	0
VAREIGVL	500	12	13	63	1.60	2.0175e-08	0
VIBRBEAM	8	31	32	104	0.68	0.15647	3
WATSON	12	8	9	44	0.21	7.76e-08	0
WATSON	31	10	11	57	0.35	5.0956e-08	0
WOODS	100	15	16	28	0.33	2.0135e-17	0
WOODS	4	15	16	28	0.23	8.0539e-19	0
WOODS	500	16	17	31	0.74	9.8289e-15	0
YFITU	3	29	30	62	0.45	2.5171e-11	0
ZANGWIL2	2	1	2	1	0.02	-18.2	0
PFIT2LS	3	52	53	86	0.78	2.9525e-11	0
PFIT3LS	3	39	40	65	0.57	4.0587e-11	0
PFIT4LS	3	40	41	63	0.59	1.5038e-10	0
EXTROSNB	10	75	76	156	1.12	1.1572e-07	0
EXTROSNB	50	78	79	155	1.31	6.0631e-07	0
EXTROSNB	100	70	71	139	1.43	8.7683e-07	0

Table 173: NMTR2 with band preconditioning and $h = 5$ on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.72	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.16	1.11e-12	0
BDQRTIC	1000	11	12	24	1.59	3983.8	0
BROYDN7D	1000	54	55	133	4.65	346.59	0
BRYBND	1000	16	17	46	2.51	1.8775e-12	0
BRYBND	5000	23	24	71	17.81	1.8862e-13	0
CRAGGLVY	1000	14	15	25	1.54	336.42	0
CRAGGLVY	5000	14	15	26	7.52	1688.2	0
DIXMAANA	1500	5	6	15	0.95	1	0
DIXMAANA	3000	5	6	15	1.90	1	0
DIXMAANB	1500	7	8	14	1.10	1	0
DIXMAANB	3000	7	8	14	2.17	1	0
DIXMAANC	1500	17	18	28	1.99	1	0
DIXMAANC	3000	14	15	27	3.65	1	0
DIXMAAND	1500	9	10	21	1.29	1	0
DIXMAAND	3000	11	12	24	2.88	1	0
DIXMAANE	1500	6	7	17	1.05	1	0
DIXMAANE	3000	6	7	17	2.08	1	0
DIXMAANF	1500	25	26	46	2.76	1	0
DIXMAANF	3000	45	46	83	8.56	1	0
DIXMAANG	1500	39	40	76	3.94	1	0
DIXMAANG	3000	57	58	111	10.52	1	0
DIXMAANH	1500	44	45	93	4.54	1	0
DIXMAANH	3000	33	34	67	7.11	1	0
DIXMAANI	1500	7	8	23	1.16	1	0
DIXMAANI	3000	7	8	29	2.46	1	0
DIXMAANJ	1500	29	30	62	3.05	1	0
DIXMAANJ	3000	42	43	100	8.45	1	0
DIXMAANK	1500	57	58	188	6.23	1	0
DIXMAANK	3000	32	33	69	6.45	1	0
DIXMAANL	1500	28	29	66	2.89	1	0
DIXMAANL	3000	120	121	245	20.97	1	0
DQDRTIC	1000	2	3	2	0.41	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.92	1.6602e-23	0
DQRTIC	1000	35	36	62	2.41	3.6952e-06	0
DQRTIC	5000	42	43	73	13.09	7.0042e-06	0
EDENSCH	2000	12	13	21	2.44	12003	0
EIGENALS	930	43	44	160	79.66	2.5686e-11	0
EIGENBLS	930	169	170	11913	1652.42	4.088e-08	0
ENGVAL1	1000	7	8	14	0.82	1108.2	0
ENGVAL1	5000	7	8	14	3.90	5548.7	0
FLETCBV2	1000	0	1	0	0.34	-0.50134	0

Table 174: NMTR2 with band preconditioning and $h = 5$ on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1014.55	-1.8877e+06	1
FMINSURF	1024	309	310	802	103.90	1	0
FMINSURF	5625	284	285	863	2204.54	1	0
FREUROTH	1000	10	11	17	1.06	121470	0
FREUROTH	5000	10	11	17	5.12	608160	0
LIARWHD	1000	14	15	35	1.26	2.0274e-20	0
LIARWHD	5000	13	14	28	5.66	6.0958e-16	0
MOREBV	1000	1	2	2	0.39	7.3289e-13	0
MOREBV	5000	1	2	2	1.89	5.8478e-15	0
MSQRTALS	1024	40	41	3939	586.55	3.8787e-09	0
MSQRTALS	529	21	22	1985	88.70	4.0963e-08	0
MSQRTBLS	529	20	21	2188	96.07	2.4397e-08	0
MSQRTBLS	1024	33	34	2175	349.42	9.9704e-09	0
NCB20B	1000	22	23	590	49.91	1676	0
NONDIA	1000	21	22	51	1.63	3.9681e-10	0
NONDIA	5000	32	33	80	10.91	5.0265e-15	0
NONDIA	10000	33	34	81	22.72	1.2547e-07	0
NONDQUAR	1000	17	18	36	1.24	1.3932e-09	0
NONDQUAR	5000	18	19	37	5.83	1.0076e-09	0
NONDQUAR	10000	19	20	38	12.19	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	45	46	285	17.26	0.0096862	0
POWELLSG	1000	15	16	30	1.07	2.2324e-06	0
POWELLSG	5000	15	16	32	4.86	5.2976e-06	0
POWELLSG	10000	15	16	32	9.88	1.0595e-05	0
POWER	1000	27	28	80	7.52	1.8888e-08	0
QUARTC	1000	35	36	62	2.41	3.6952e-06	0
QUARTC	5000	42	43	73	13.15	7.0042e-06	0
QUARTC	10000	45	46	78	27.61	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.75	-2994	0
SCHMVETT	5000	3	4	6	3.44	-14994	0
SCHMVETT	10000	3	4	6	6.92	-29994	0
SINQUAD	1000	55	56	170	6.22	1.5962e-08	0
SINQUAD	5000	77	78	222	61.38	2.7421e-08	0
SINQUAD	10000	87	88	254	156.31	2.4936e-08	0
SPMSRTLS	1000	27	28	58	3.57	1.1147e-15	0
SPMSRTLS	4999	32	33	71	20.72	5.1698e-12	0
SPMSRTLS	10000	59	60	128	70.76	8.5907e-15	0
SROSENBR	1000	10	11	20	0.82	5.8309e-13	0
SROSENBR	5000	10	11	20	3.83	2.9154e-12	0
SROSENBR	10000	10	11	20	7.74	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.58	7.6524e-11	0

Table 175: NMTR2 with band preconditioning and $h = 5$ on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.45	10	0
TOINTGSS	5000	2	3	4	2.13	10	0
TOINTGSS	10000	2	3	4	4.26	10	0
TQUARTIC	1000	12	13	36	1.19	2.9487e-11	0
TQUARTIC	5000	20	21	51	10.00	1.1107e-10	0
TQUARTIC	10000	18	19	44	23.17	3.5718e-15	0
TRIDIA	1000	2	3	3	0.49	1.3827e-32	0
TRIDIA	5000	2	3	3	2.27	4.1976e-33	0
TRIDIA	10000	2	3	3	4.52	5.3451e-33	0
VARDIM	1000	36	37	36	18.89	1.1203e-20	0
VARDIM	5000	45	46	45	547.56	1.1459e-18	0
VAREIGVL	1000	12	13	70	4.48	5.6139e-08	0
VAREIGVL	5000	13	14	59	83.52	7.7013e-08	0
WOODS	1000	16	17	31	1.24	1.9658e-14	0
WOODS	10000	16	17	31	12.00	1.9658e-13	0
FLETCHCR	1000	1321	1322	2642	80.12	1.5315e-20	0
GENROSE	1000	451	452	1033	27.09	1	0

Table 176: NMTR2 with band preconditioning and $h = 5$ on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	87	88	4072	23.48	0	0
CATENARY	501	542	543	12379	65.46	-348400	0
CHANDHEQ	100	13	14	62	6.86	6.7959e-08	0
CHEMRCTA	100	36	37	608	1.26	5.102e-15	0
CHEMRCTB	1000	52	53	165	6.35	6.1367e-20	0
CLPLATEC	5041	3	4	3935	201.89	-0.0050207	0
CORKSCRW	456	129	130	76738	224.42	26.484	0
DALLASM	196	82	83	15783	25.28	-48198	0
DISCS	36	117	118	3477	6.75	12	0
DRUGDIS	304	211	212	3821	19.77	4.2452	0
DTOC5	9999	25	26	91	47.88	1.5316	0
EXPFITB	5	62	63	902	2.59	0.0050193	0
EXPFITC	5	84	85	1696	13.87	0.023303	0
FCCU	19	16	17	57	0.35	11.149	0
FLETCHER	4	32	33	65	0.52	19.525	0
GILBERT	500	29	30	71	3.50	237.37	0
GRIDNETA	3444	35	36	3753	91.69	161.61	0
GRIDNETE	3444	27	28	2939	105.14	144.06	0
HADAMARD	257	304	305	22628	285.96	1	0
HAGER3	2001	12	13	32	4.21	0.14096	0
HAGER4	2001	11	12	2294	46.33	2.7942	0
HS114	10	524	525	2913	8.34	-1768.8	0
HS59	2	168	169	348	2.62	-7.8028	0
HS75	4	136	137	546	2.10	5174.4	0
HVYCRASH	204	173	174	2309	8.96	-0.2185	0
HYDROELL	1009	143	144	22557	260.38	-3.5855e+06	0
JUNKTURN	5010	62	63	798	71.08	9.4616e-06	0
KSIP	20	69	70	3794	66.25	0.57579	0
LINVERSE	1999	25	26	963	43.35	681	0
LMINSURF	1024	362	363	948	34.35	9	0
MANNE	300	6	7	75	1.00	-0.97457	0
MEYER3	3	103	104	242	1.58	87.946	0
MINPERM	51	18	19	141	0.52	0.0384	0
MISTAKE	9	31	32	196	0.59	-1	0
NGONE	50	498	499	13159	71.64	-0.64103	0
NLMSURF	1024	1250	1251	3366	119.61	38.591	0
NYSTROM5	18	28	29	453	0.64	2.4426e-05	0
ODC	10404	19	20	916	146.45	-0.0040122	0
OET1	3	38	39	974	13.84	0.53824	0
OPTCTRL3	122	61	62	249	1.79	2048	0
ORTHREGA	2053	172	173	897	61.02	5661.4	0
ORTHREGC	5005	61	62	401	65.50	94.813	0

Table 177: NMTR2 with band preconditioning and $h = 5$ on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	111	112	623	3.16	15.59	0
ORTHREGF	1205	246	247	571	29.44	21.056	0
PRODPL1	60	50	51	1217	1.51	35.739	0
QR3D	610	123	124	13934	401.43	1.1139e-08	0
QR3DBD	457	79	80	1338	36.78	2.6819e-10	0
READING1	202	339	340	8683	27.37	-0.16049	0
SEMICON1	102	398	399	803	13.87	7.0312e-16	0
SEMICON2	1002	134	135	261	29.91	1.6734e-06	0
SIPOW1	2	40	41	1239	32.18	-1	0
SPANHYD	97	33	34	898	1.44	239.74	0
SSC	10404	1	2	93	28.53	-2.0782	0
SSEBNLN	194	65	66	1425	3.25	1.6171e+07	0
SSNLBEAM	3003	239	240	7246	278.90	340.03	0
STEENBRE	540	1730	1731	71795	150.34	27465	0
TENBARS1	18	289	290	3936	5.56	2295.4	0
TENBARS2	18	187	188	1416	3.24	2277.9	0
TRAINF	408	43	44	1275	5.39	3.0975	0
TRUSPYR1	11	435	436	2039	6.99	11.229	0
UBH5	1010	60	61	18864	117.50	1.1163	0
WATER	31	42	43	416	0.84	10549	0
ZIGZAG	304	89	90	17835	43.69	33.787	0

Table 178: NMTR2 with band preconditioning and $h = 5$ on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.15	5.7444	0
ARWHEAD	100	5	6	7	0.15	0	0
ARWHEAD	500	5	6	6	0.39	1.3237e-09	0
BARD	3	7	8	13	0.14	0.0082149	0
BDQRTIC	100	11	12	23	0.31	378.77	0
BDQRTIC	500	11	12	24	0.83	1981	0
BEALE	2	7	8	14	0.12	2.9425e-14	0
BIGGS6	6	69	70	145	1.08	1.6361e-11	0
BOX3	3	7	8	13	0.13	1.9221e-11	0
BRKMCC	2	3	4	5	0.07	0.16904	0
BROWNAL	10	5	6	42	0.10	9.2726e-11	0
BROWNBS	2	34	35	50	0.51	0	0
BROWNDEN	4	11	12	20	0.19	85822	0
BROYDN7D	10	16	17	32	0.26	1.2611	0
BROYDN7D	100	29	30	67	0.62	30.492	0
BROYDN7D	500	48	49	109	2.34	169.56	0
BRYBND	10	11	12	36	0.19	7.2241e-15	0
BRYBND	100	12	13	38	0.37	1.3572e-12	0
BRYBND	500	15	16	43	1.28	1.7435e-13	0
CHNROSNB	10	22	23	44	0.35	6.5468e-12	0
CLIFF	2	27	28	30	0.42	0.19979	0
CRAGGLVY	100	14	15	25	0.36	32.27	0
CRAGGLVY	4	16	17	30	0.25	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.85	167.45	0
CUBE	2	32	33	59	0.48	7.6271e-15	0
DENSCHNA	2	5	6	9	0.09	1.2e-15	0
DENSCHNB	2	3	4	5	0.06	0	0
DENSCHNC	2	9	10	13	0.15	1.8423e-13	0
DENSCHND	3	33	34	63	0.49	8.6576e-09	0
DENSCHNE	3	11	12	16	0.17	2.4642e-12	0
DENSCHNF	2	6	7	12	0.12	6.5139e-22	0
DIXMAANA	15	5	6	9	0.08	1	0
DIXMAANA	90	5	6	14	0.12	1	0
DIXMAANA	300	5	6	14	0.24	1	0
DIXMAANB	15	6	7	11	0.09	1	0
DIXMAANB	90	8	9	18	0.17	1	0
DIXMAANB	300	7	8	13	0.29	1	0
DIXMAANC	15	9	10	15	0.12	1	0
DIXMAANC	90	9	10	16	0.17	1	0
DIXMAANC	300	11	12	20	0.39	1	0
DIXMAAND	15	9	10	16	0.11	1	0
DIXMAAND	90	10	11	21	0.19	1	0

Table 179: NMTR2 with band preconditioning and $h = 10$ on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.39	1	0
DIXMAANE	15	6	7	12	0.09	1	0
DIXMAANE	90	6	7	16	0.13	1	0
DIXMAANE	300	6	7	16	0.26	1	0
DIXMAANF	15	10	11	20	0.12	1	0
DIXMAANF	90	10	11	21	0.18	1	0
DIXMAANF	300	45	46	92	1.19	1	0
DIXMAANG	15	11	12	22	0.13	1	0
DIXMAANG	90	16	17	33	0.26	1	0
DIXMAANG	300	29	30	56	0.83	1	0
DIXMAANH	15	13	14	26	0.15	1	0
DIXMAANH	90	19	20	40	0.31	1	0
DIXMAANH	300	26	27	52	0.77	1	0
DIXMAANI	15	5	6	11	0.07	1	0
DIXMAANI	90	6	7	15	0.13	1	0
DIXMAANI	300	6	7	15	0.26	1	0
DIXMAANJ	15	12	13	24	0.13	1	0
DIXMAANJ	90	20	21	42	0.31	1	0
DIXMAANJ	300	21	22	43	0.65	1	0
DIXMAANK	15	16	17	32	0.18	1	0
DIXMAANK	90	18	19	37	0.30	1	0
DIXMAANK	300	28	29	57	0.81	1	0
DIXMAANL	15	15	16	29	0.17	1	0
DIXMAANL	90	24	25	47	0.37	1	0
DIXMAANL	300	51	52	102	1.33	1	0
DIXON3DQ	10	2	3	4	0.06	0	0
DJTL	2	127	128	173	1.73	-8951.5	0
DQDRTIC	10	2	3	2	0.06	1.6602e-23	0
DQDRTIC	100	2	3	2	0.08	1.6602e-23	0
DQDRTIC	500	2	3	2	0.23	1.6602e-23	0
DQRTIC	100	26	27	47	0.51	4.5801e-07	0
DQRTIC	500	33	34	59	1.36	5.8379e-07	0
EDENSCH	36	12	13	21	0.23	219.28	0
EIGENALS	110	20	21	70	1.02	1.022e-10	0
EIGENALS	420	35	36	120	14.75	1.7732e-11	0
EIGENBLS	110	71	72	992	7.36	1.7454e-09	0
EIGENBLS	420	138	139	4254	199.65	6.152e-08	0
EIGENCLS	462	254	255	3554	267.91	9.3179e-10	0
ENGVAL1	100	7	8	14	0.19	109.09	0
ENGVAL1	2	7	8	12	0.12	0	0
ERRINROS	10	46	47	85	0.69	6.6946	0
ERRINROS	50	55	56	102	0.96	39.904	0

Table 180: NMTR2 with band preconditioning and $h = 10$ on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.20	0.24051	0
EXTROSNB	5	34	35	67	0.50	1.0288e-12	0
FLETCBV2	100	1	2	2	0.07	-0.51401	0
FLETCBV3	100	—	—	—	—	—	6
FLETCHBV	10	235	236	424	3.47	-2.2511e+06	0
FLETCHBV	100	10000	10001	14699	226.58	-5.0652e+11	1
FLETCHCR	10	26	27	52	0.41	2.0952e-18	0
FLETCHCR	100	144	145	288	2.72	1.1673e-17	0
FMINSURF	121	83	84	228	2.51	1	0
FMINSURF	16	18	19	37	0.29	1	0
FREUROTH	100	10	11	17	0.25	11965	0
FREUROTH	2	9	10	14	0.15	48.984	0
FREUROTH	50	10	11	17	0.21	5881	0
FREUROTH	500	10	11	17	0.61	60634	0
GENROSE	10	30	31	58	0.46	1	0
GENROSE	100	75	76	164	1.46	1	0
GENROSE	500	255	256	571	9.46	1	0
GROWTHLS	3	73	74	122	1.08	1.004	0
GULF	3	31	32	59	0.63	2.5375e-14	0
HAIRY	2	54	55	83	0.50	20	0
HATFLDD	3	19	20	37	0.32	6.6151e-08	0
HATFLDE	3	22	23	43	0.37	5.1204e-07	0
HEART6LS	6	661	662	1401	10.00	2.2089e-09	0
HELIX	3	12	13	23	0.20	2.9584e-13	0
HILBERTA	2	2	3	2	0.04	6.656e-31	0
HILBERTB	5	2	3	2	0.04	1.5953e-29	0
HIMMELBB	2	12	13	15	0.18	2.0444e-23	0
HIMMELBF	4	45	46	147	0.70	318.57	0
HIMMELBG	2	8	9	11	0.09	5.1108e-17	0
HIMMELBH	2	1	2	1	0.03	-1	0
HYDC20LS	0	—	—	—	—	—	6
JENSMP	2	9	10	14	0.16	124.36	0
KOWOSB	4	10	11	20	0.16	0.0003078	0
LIARWHD	100	13	14	37	0.32	9.0888e-21	0
LIARWHD	36	10	11	32	0.20	1.1625e-16	0
LIARWHD	500	15	16	36	0.77	3.7352e-14	0
LOGROS	2	38	39	54	0.55	3.6105e-11	0
MANCINO	100	15	16	23	17.90	9.2449e-18	0
MOREBV	10	2	3	4	0.05	6.582e-14	0
MOREBV	100	1	2	2	0.08	7.887e-10	0
MOREBV	500	1	2	2	0.22	5.9316e-12	0
MSQRTALS	100	17	18	245	1.65	5.5682e-10	0

Table 181: NMTR2 with band preconditioning and $h = 10$ on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.23	6.2623e-12	0
MSQRTALS	49	19	20	143	0.61	1.3997e-10	0
MSQRTBLS	100	19	20	255	1.73	1.6921e-09	0
MSQRTBLS	49	17	18	161	0.60	2.0502e-10	0
MSQRTBLS	9	13	14	36	0.20	4.8784e-11	0
NCB20B	100	22	23	931	5.56	196.68	0
NCB20B	50	18	19	458	1.28	99.504	0
NCB20B	500	21	22	727	30.01	897.52	0
NONDIA	100	19	20	47	0.42	2.898e-15	0
NONDIA	50	17	18	40	0.31	4.9376e-13	0
NONDIA	500	18	19	42	0.87	2.4158e-10	0
NONDQUAR	100	15	16	37	0.33	2.2854e-09	0
NONDQUAR	500	16	17	36	0.77	3.9386e-09	0
NONMSQRT	100	—	—	—	—	—	6
NONMSQRT	49	—	—	—	—	—	6
NONMSQRT	9	63	64	168	0.98	0.75193	0
OSBORNEA	5	40	41	92	0.71	5.4679e-05	0
OSBORNEB	11	19	20	78	0.55	0.040138	0
PALMER1C	8	20	21	174	0.38	0.097605	0
PALMER1D	7	14	15	56	0.27	0.65267	0
PALMER2C	8	19	20	200	0.36	0.014369	0
PALMER3C	8	11	12	78	0.21	0.019539	0
PALMER4C	8	24	25	215	0.44	0.050312	0
PENALTY1	10	23	24	69	0.37	7.0993e-05	0
PENALTY1	100	33	34	243	0.89	0.00090254	0
PENALTY1	50	31	32	246	0.63	0.00043182	0
PENALTY1	500	39	40	217	5.11	0.0047791	0
PENALTY2	10	69	70	240	1.07	0.00029386	0
PENALTY2	100	19	20	87	0.58	97096	0
PENALTY2	50	23	24	117	0.51	4.2961	0
PENALTY3	100	22	23	55	20.42	0.001	0
PENALTY3	50	21	22	56	4.02	0.001	0
PFIT1LS	3	88	89	160	1.32	4.5882e-08	0
POWELLSG	100	15	16	30	0.33	2.1902e-07	0
POWELLSG	500	15	16	30	0.66	1.1139e-06	0
POWELLSG	20	15	16	30	0.25	4.0054e-08	0
POWELLSG	4	15	16	30	0.25	4.2527e-09	0
POWER	10	16	17	40	0.26	1.1098e-08	0
POWER	100	22	23	66	0.53	5.0264e-09	0
POWER	50	19	20	54	0.36	2.3411e-08	0
POWER	500	26	27	78	2.48	5.9786e-09	0
QUARTC	100	26	27	47	0.53	4.5801e-07	0

Table 182: NMTR2 with band preconditioning and $h = 10$ on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.35	5.2022e-08	0
QUARTC	500	33	34	59	1.36	5.8379e-07	0
ROSENBR	2	26	27	45	0.39	3.2328e-13	0
S308	2	10	11	16	0.16	0.7732	0
SCHMVETT	10	3	4	6	0.05	-24	0
SCHMVETT	500	3	4	6	0.37	-1494	0
SCHMVETT	3	3	4	6	0.05	-3	0
SCHMVETT	500	3	4	6	0.37	-1494	0
SINQUAD	100	40	41	140	0.96	4.1555e-08	0
SINQUAD	5	11	12	22	0.18	1.1721e-08	0
SINQUAD	50	33	34	124	0.64	1.4352e-07	0
SINQUAD	500	51	52	158	3.01	1.9161e-08	0
SISSER	2	12	13	19	0.19	1.1139e-08	0
SNAIL	2	72	73	129	0.77	3.2287e-13	0
SPMSRTLS	100	14	15	26	0.38	3.2303e-13	0
SPMSRTLS	28	12	13	22	0.23	3.2953e-16	0
SPMSRTLS	499	20	21	39	1.51	1.9096e-16	0
SROSENBR	10	6	7	10	0.11	4.6748e-17	0
SROSENBR	100	6	7	10	0.16	4.6748e-16	0
SROSENBR	50	6	7	10	0.13	2.3374e-16	0
SROSENBR	500	10	11	20	0.50	2.9154e-13	0
TOINTGOR	50	9	10	84	0.22	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.08	10	0
TOINTGSS	50	2	3	4	0.06	10	0
TOINTGSS	500	2	3	4	0.24	10	0
TOINTPSP	50	23	24	88	0.45	225.56	0
TOINTQOR	50	6	7	30	0.14	1175.5	0
TQUARTIC	100	12	13	35	0.28	2.7682e-11	0
TQUARTIC	5	1	2	2	0.04	4.4373e-31	0
TQUARTIC	50	10	11	35	0.19	5.2793e-13	0
TQUARTIC	500	15	16	42	0.79	4.787e-15	0
TRIDIA	10	1	2	2	0.04	1.0805e-30	0
TRIDIA	100	2	3	3	0.09	1.352e-32	0
TRIDIA	50	2	3	3	0.08	1.352e-32	0
TRIDIA	500	2	3	3	0.28	1.3482e-32	0
VARDIM	10	14	15	14	0.23	1.595e-26	0
VARDIM	100	25	26	25	0.60	5.171e-26	0
VARDIM	50	22	23	22	0.41	1.2641e-27	0
VARDIM	500	33	34	33	5.11	1.1634e-25	0
VAREIGVL	10	36	37	156	0.57	7.2928e-12	0
VAREIGVL	100	12	13	84	0.41	3.3727e-09	0

Table 183: NMTR2 with band preconditioning and $h = 10$ on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.34	2.9295e-10	0
VAREIGVL	500	12	13	63	1.61	2.0175e-08	0
VIBRBEAM	8	31	32	104	0.69	0.15647	3
WATSON	12	8	9	44	0.23	7.76e-08	0
WATSON	31	10	11	57	0.36	5.0956e-08	0
WOODS	100	15	16	28	0.32	2.0135e-17	0
WOODS	4	15	16	28	0.23	8.0539e-19	0
WOODS	500	16	17	31	0.76	9.8289e-15	0
YFITU	3	29	30	62	0.44	2.5171e-11	0
ZANGWIL2	2	1	2	1	0.03	-18.2	0
PFIT2LS	3	52	53	86	0.76	2.9525e-11	0
PFIT3LS	3	39	40	65	0.56	4.0587e-11	0
PFIT4LS	3	40	41	63	0.59	1.5038e-10	0
EXTROSNB	10	75	76	156	1.13	1.1572e-07	0
EXTROSNB	50	78	79	155	1.37	6.0631e-07	0
EXTROSNB	100	70	71	139	1.46	8.7683e-07	0

Table 184: NMTR2 with band preconditioning and $h = 10$ on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.76	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.18	1.11e-12	0
BDQRTIC	1000	11	12	24	1.59	3983.8	0
BROYDN7D	1000	54	55	133	4.71	346.59	0
BRYBND	1000	16	17	46	2.52	1.8775e-12	0
BRYBND	5000	23	24	71	17.83	1.8862e-13	0
CRAGGLVY	1000	14	15	25	1.54	336.42	0
CRAGGLVY	5000	14	15	26	7.56	1688.2	0
DIXMAANA	1500	5	6	15	0.96	1	0
DIXMAANA	3000	5	6	15	1.92	1	0
DIXMAANB	1500	7	8	14	1.10	1	0
DIXMAANB	3000	7	8	14	2.20	1	0
DIXMAANC	1500	17	18	28	1.99	1	0
DIXMAANC	3000	14	15	27	3.68	1	0
DIXMAAND	1500	9	10	21	1.33	1	0
DIXMAAND	3000	11	12	24	2.97	1	0
DIXMAANE	1500	6	7	17	1.09	1	0
DIXMAANE	3000	6	7	17	2.17	1	0
DIXMAANF	1500	25	26	46	2.80	1	0
DIXMAANF	3000	45	46	83	8.62	1	0
DIXMAANG	1500	39	40	76	3.95	1	0
DIXMAANG	3000	57	58	111	10.62	1	0
DIXMAANH	1500	44	45	93	4.57	1	0
DIXMAANH	3000	33	34	67	7.14	1	0
DIXMAANI	1500	7	8	23	1.19	1	0
DIXMAANI	3000	7	8	29	2.55	1	0
DIXMAANJ	1500	29	30	62	3.10	1	0
DIXMAANJ	3000	42	43	100	8.49	1	0
DIXMAANK	1500	58	59	204	6.53	1	0
DIXMAANK	3000	32	33	69	6.51	1	0
DIXMAANL	1500	28	29	66	2.94	1	0
DIXMAANL	3000	95	96	193	17.06	1	0
DQDRTIC	1000	2	3	2	0.42	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.98	1.6602e-23	0
DQRTIC	1000	35	36	62	2.41	3.6952e-06	0
DQRTIC	5000	42	43	73	13.08	7.0042e-06	0
EDENSCH	2000	12	13	21	2.47	12003	0
EIGENALS	930	43	44	160	79.58	2.5686e-11	0
EIGENBLS	930	169	170	11913	1661.10	4.088e-08	0
ENGVAL1	1000	7	8	14	0.85	1108.2	0
ENGVAL1	5000	7	8	14	3.93	5548.7	0
FLETCBV2	1000	0	1	0	0.34	-0.50134	0

Table 185: NMTR2 with band preconditioning and $h = 10$ on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	—	—	—	—	—	6
FMINSURF	1024	317	318	797	107.41	1	0
FMINSURF	5625	284	285	863	2222.48	1	0
FREUROTH	1000	10	11	17	1.09	121470	0
FREUROTH	5000	10	11	17	5.15	608160	0
LIARWHD	1000	14	15	35	1.31	2.0274e-20	0
LIARWHD	5000	13	14	28	5.68	6.0958e-16	0
MOREBV	1000	1	2	2	0.40	7.3289e-13	0
MOREBV	5000	1	2	2	1.87	5.8478e-15	0
MSQRTALS	1024	40	41	3939	586.88	3.8787e-09	0
MSQRTALS	529	21	22	1985	89.32	4.0963e-08	0
MSQRTBLS	529	20	21	2188	96.18	2.4397e-08	0
MSQRTBLS	1024	33	34	2175	350.85	9.9704e-09	0
NCB20B	1000	22	23	590	50.01	1676	0
NONDIA	1000	21	22	51	1.69	3.9681e-10	0
NONDIA	5000	32	33	80	10.98	5.0265e-15	0
NONDIA	10000	33	34	81	22.79	1.2547e-07	0
NONDQUAR	1000	17	18	36	1.25	1.3932e-09	0
NONDQUAR	5000	18	19	37	5.85	1.0076e-09	0
NONDQUAR	10000	19	20	38	12.25	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	45	46	285	17.61	0.0096862	0
POWELLSG	1000	15	16	30	1.09	2.2324e-06	0
POWELLSG	5000	15	16	32	4.86	5.2976e-06	0
POWELLSG	10000	15	16	32	9.88	1.0595e-05	0
POWER	1000	27	28	80	7.61	1.8888e-08	0
QUARTC	1000	35	36	62	2.38	3.6952e-06	0
QUARTC	5000	42	43	73	12.96	7.0042e-06	0
QUARTC	10000	45	46	78	27.74	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.77	-2994	0
SCHMVETT	5000	3	4	6	3.49	-14994	0
SCHMVETT	10000	3	4	6	6.95	-29994	0
SINQUAD	1000	55	56	170	6.22	1.5962e-08	0
SINQUAD	5000	77	78	222	61.65	2.7421e-08	0
SINQUAD	10000	87	88	254	157.17	2.4936e-08	0
SPMSRTLS	1000	27	28	58	3.62	1.1147e-15	0
SPMSRTLS	4999	32	33	71	20.77	5.1698e-12	0
SPMSRTLS	10000	76	77	162	88.12	8.2574e-13	0
SROSENBR	1000	10	11	20	0.85	5.8309e-13	0
SROSENBR	5000	10	11	20	3.84	2.9154e-12	0
SROSENBR	10000	10	11	20	7.80	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.58	7.6524e-11	0

Table 186: NMTR2 with band preconditioning and $h = 10$ on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.45	10	0
TOINTGSS	5000	2	3	4	2.12	10	0
TOINTGSS	10000	2	3	4	4.21	10	0
TQUARTIC	1000	12	13	36	1.17	2.9487e-11	0
TQUARTIC	5000	20	21	51	10.08	1.1107e-10	0
TQUARTIC	10000	18	19	44	23.14	3.5718e-15	0
TRIDIA	1000	2	3	3	0.49	1.3827e-32	0
TRIDIA	5000	2	3	3	2.26	4.1976e-33	0
TRIDIA	10000	2	3	3	4.52	5.3451e-33	0
VARDIM	1000	36	37	36	18.82	1.1203e-20	0
VARDIM	5000	45	46	45	546.41	1.1459e-18	0
VAREIGVL	1000	12	13	70	4.47	5.6139e-08	0
VAREIGVL	5000	13	14	59	83.90	7.7013e-08	0
WOODS	1000	16	17	31	1.24	1.9658e-14	0
WOODS	10000	16	17	31	12.00	1.9658e-13	0
FLETCHCR	1000	1321	1322	2642	79.04	1.5315e-20	0
GENROSE	1000	451	452	1033	26.73	1	0

Table 187: NMTR2 with band preconditioning and $h = 10$ on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	87	88	4072	23.69	0	0
CATENARY	501	453	454	13063	63.74	-348400	0
CHANDHEQ	100	13	14	62	6.78	6.7959e-08	0
CHEMRCTA	100	36	37	608	1.25	5.102e-15	0
CHEMRCTB	1000	52	53	165	6.24	6.1367e-20	0
CLPLATEC	5041	3	4	3935	199.60	-0.0050207	0
CORKSCRW	456	129	130	76738	222.20	26.484	0
DALLASM	196	82	83	15783	24.87	-48198	0
DISCS	36	117	118	3477	6.74	12	0
DRUGDIS	304	211	212	3821	19.39	4.2452	0
DTOC5	9999	25	26	91	46.75	1.5316	0
EXPFITB	5	62	63	902	2.53	0.0050193	0
EXPFITC	5	84	85	1696	13.76	0.023303	0
FCCU	19	16	17	57	0.32	11.149	0
FLETCHER	4	32	33	65	0.51	19.525	0
GILBERT	500	29	30	71	3.46	237.37	0
GRIDNETA	3444	35	36	3753	90.88	161.61	0
GRIDNETE	3444	27	28	2939	104.79	144.06	0
HADAMARD	257	304	305	22628	286.55	1	0
HAGER3	2001	12	13	32	4.14	0.14096	0
HAGER4	2001	11	12	2294	46.31	2.7942	0
HS114	10	460	461	2598	7.15	-1768.8	0
HS59	2	168	169	348	2.49	-7.8028	0
HS75	4	136	137	546	2.01	5174.4	0
HVYCRASH	204	173	174	2309	8.82	-0.2185	0
HYDROELL	1009	143	144	22557	254.74	-3.5855e+06	0
JUNKTURN	5010	62	63	798	71.68	9.4616e-06	0
KSIP	20	69	70	3794	65.93	0.57579	0
LINVERSE	1999	25	26	963	43.66	681	0
LMINSURF	1024	362	363	948	34.09	9	0
MANNE	300	6	7	75	0.99	-0.97457	0
MEYER3	3	103	104	242	1.54	87.946	0
MINPERM	51	18	19	141	0.52	0.0384	0
MISTAKE	9	31	32	196	0.56	-1	0
NGONE	50	498	499	13159	72.76	-0.64103	0
NLMSURF	1024	1158	1159	3136	109.53	38.591	0
NYSTROM5	18	28	29	453	0.64	2.4426e-05	0
ODC	10404	19	20	916	143.85	-0.0040122	0
OET1	3	38	39	974	13.52	0.53824	0
OPTCTRL3	122	61	62	249	1.72	2048	0
ORTHREGA	2053	172	173	897	60.46	5661.4	0
ORTHREGC	5005	61	62	401	64.61	94.813	0

Table 188: NMTR2 with band preconditioning and $h = 10$ on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	113	114	685	3.24	15.59	0
ORTHREGF	1205	246	247	586	29.14	26.712	0
PRODPL1	60	64	65	1195	1.66	35.739	0
QR3D	610	123	124	13934	397.28	1.1139e-08	0
QR3DBD	457	79	80	1338	36.35	2.6819e-10	0
READING1	202	320	321	8658	27.56	-0.16049	0
SEMICON1	102	398	399	803	13.09	7.0312e-16	0
SEMICON2	1002	134	135	261	28.84	1.6734e-06	0
SIPOW1	2	40	41	1239	31.96	-1	0
SPANHYD	97	30	31	696	1.23	239.74	0
SSC	10404	1	2	93	28.42	-2.0782	0
SSEBNLN	194	63	64	1364	3.16	1.6171e+07	0
SSNLBEAM	3003	239	240	7246	277.71	340.03	0
STEENBRE	540	3454	3455	138367	297.52	27465	0
TENBARS1	18	494	495	5550	8.98	2295.4	0
TENBARS2	18	157	158	1149	2.68	2277.9	0
TRAINF	408	43	44	1275	5.35	3.0975	0
TRUSPYR1	11	463	464	2232	7.42	11.229	0
UBH5	1010	60	61	18864	116.71	1.1163	0
WATER	31	40	41	357	0.77	10549	0
ZIGZAG	304	89	90	17835	43.61	33.787	0

Table 189: NMTR2 with band preconditioning and $h = 10$ on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	13	0.16	5.7444	0
ARWHEAD	100	5	6	7	0.15	0	0
ARWHEAD	500	5	6	6	0.40	1.3237e-09	0
BARD	3	7	8	13	0.13	0.0082149	0
BDQRTIC	100	11	12	23	0.30	378.77	0
BDQRTIC	500	11	12	24	0.82	1981	0
BEALE	2	7	8	14	0.12	2.9425e-14	0
BIGGS6	6	69	70	145	1.04	1.6361e-11	0
BOX3	3	7	8	13	0.12	1.9221e-11	0
BRKMCC	2	3	4	5	0.07	0.16904	0
BROWNAL	10	5	6	42	0.12	9.2726e-11	0
BROWNBS	2	34	35	50	0.50	0	0
BROWNDEN	4	11	12	20	0.19	85822	0
BROYDN7D	10	16	17	32	0.26	1.2611	0
BROYDN7D	100	29	30	67	0.62	30.492	0
BROYDN7D	500	48	49	109	2.36	169.56	0
BRYBND	10	11	12	36	0.18	7.2241e-15	0
BRYBND	100	12	13	38	0.36	1.3572e-12	0
BRYBND	500	15	16	43	1.26	1.7435e-13	0
CHNROSNB	10	22	23	44	0.35	6.5468e-12	0
CLIFF	2	27	28	30	0.40	0.19979	0
CRAGGLVY	100	14	15	25	0.34	32.27	0
CRAGGLVY	4	16	17	30	0.25	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.86	167.45	0
CUBE	2	32	33	59	0.45	7.6271e-15	0
DENSCHNA	2	5	6	9	0.09	1.2e-15	0
DENSCHNB	2	3	4	5	0.06	0	0
DENSCHNC	2	9	10	13	0.16	1.8423e-13	0
DENSCHND	3	33	34	63	0.49	8.6576e-09	0
DENSCHNE	3	11	12	16	0.18	2.4642e-12	0
DENSCHNF	2	6	7	12	0.11	6.5139e-22	0
DIXMAANA	15	5	6	9	0.07	1	0
DIXMAANA	90	5	6	14	0.12	1	0
DIXMAANA	300	5	6	14	0.24	1	0
DIXMAANB	15	6	7	11	0.08	1	0
DIXMAANB	90	8	9	18	0.15	1	0
DIXMAANB	300	7	8	13	0.28	1	0
DIXMAANC	15	9	10	15	0.11	1	0
DIXMAANC	90	9	10	16	0.17	1	0
DIXMAANC	300	11	12	20	0.38	1	0
DIXMAAND	15	9	10	16	0.11	1	0
DIXMAAND	90	10	11	21	0.18	1	0

Table 190: NMTR2 with band preconditioning and $h = 15$ on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	10	11	20	0.38	1	0
DIXMAANE	15	6	7	12	0.08	1	0
DIXMAANE	90	6	7	16	0.13	1	0
DIXMAANE	300	6	7	16	0.26	1	0
DIXMAANF	15	10	11	20	0.12	1	0
DIXMAANF	90	10	11	21	0.18	1	0
DIXMAANF	300	45	46	92	1.19	1	0
DIXMAANG	15	11	12	22	0.12	1	0
DIXMAANG	90	16	17	33	0.26	1	0
DIXMAANG	300	29	30	56	0.83	1	0
DIXMAANH	15	13	14	26	0.15	1	0
DIXMAANH	90	19	20	40	0.31	1	0
DIXMAANH	300	26	27	52	0.74	1	0
DIXMAANI	15	5	6	11	0.07	1	0
DIXMAANI	90	6	7	15	0.12	1	0
DIXMAANI	300	6	7	15	0.25	1	0
DIXMAANJ	15	12	13	24	0.13	1	0
DIXMAANJ	90	20	21	42	0.30	1	0
DIXMAANJ	300	21	22	43	0.66	1	0
DIXMAANK	15	16	17	32	0.17	1	0
DIXMAANK	90	18	19	37	0.29	1	0
DIXMAANK	300	28	29	57	0.80	1	0
DIXMAANL	15	15	16	29	0.16	1	0
DIXMAANL	90	24	25	47	0.38	1	0
DIXMAANL	300	51	52	102	1.31	1	0
DIXON3DQ	10	2	3	4	0.06	0	0
DJTL	2	127	128	173	1.73	-8951.5	0
DQDRTIC	10	2	3	2	0.05	1.6602e-23	0
DQDRTIC	100	2	3	2	0.09	1.6602e-23	0
DQDRTIC	500	2	3	2	0.23	1.6602e-23	0
DQRTIC	100	26	27	47	0.50	4.5801e-07	0
DQRTIC	500	33	34	59	1.34	5.8379e-07	0
EDENSCH	36	12	13	21	0.22	219.28	0
EIGENALS	110	20	21	70	1.03	1.022e-10	0
EIGENALS	420	35	36	120	14.70	1.7732e-11	0
EIGENBLS	110	71	72	992	7.40	1.7454e-09	0
EIGENBLS	420	138	139	4254	198.48	6.152e-08	0
EIGENCLS	462	222	223	2727	219.83	1.0306e-09	0
ENGVAL1	100	7	8	14	0.18	109.09	0
ENGVAL1	2	7	8	12	0.12	0	0
ERRINROS	10	46	47	85	0.70	6.6946	0
ERRINROS	50	55	56	102	0.93	39.904	0

Table 191: NMTR2 with band preconditioning and $h = 15$ on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.19	0.24051	0
EXTROSNB	5	34	35	67	0.50	1.0288e-12	0
FLETCBV2	100	1	2	2	0.07	-0.51401	0
FLETCBV3	100	10000	10001	20193	213.83	-3486.3	1
FLETCHBV	10	238	239	430	3.47	-2.2511e+06	0
FLETCHBV	100	10000	10001	14699	225.02	-5.0652e+11	1
FLETCHCR	10	26	27	52	0.38	2.0952e-18	0
FLETCHCR	100	144	145	288	2.74	1.1673e-17	0
FMINSURF	121	88	89	233	2.65	1	0
FMINSURF	16	18	19	37	0.28	1	0
FREUROTH	100	10	11	17	0.24	11965	0
FREUROTH	2	9	10	14	0.15	48.984	0
FREUROTH	50	10	11	17	0.19	5881	0
FREUROTH	500	10	11	17	0.61	60634	0
GENROSE	10	30	31	58	0.45	1	0
GENROSE	100	75	76	164	1.39	1	0
GENROSE	500	255	256	571	9.32	1	0
GROWTHLS	3	73	74	122	1.07	1.004	0
GULF	3	31	32	59	0.66	2.5375e-14	0
HAIRY	2	54	55	83	0.54	20	0
HATFLDD	3	19	20	37	0.29	6.6151e-08	0
HATFLDE	3	22	23	43	0.34	5.1204e-07	0
HEART6LS	6	661	662	1401	9.89	2.2089e-09	0
HELIX	3	12	13	23	0.19	2.9584e-13	0
HILBERTA	2	2	3	2	0.04	6.656e-31	0
HILBERTB	5	2	3	2	0.03	1.5953e-29	0
HIMMELBB	2	12	13	15	0.17	2.0444e-23	0
HIMMELBF	4	45	46	147	0.69	318.57	0
HIMMELBG	2	8	9	11	0.09	5.1108e-17	0
HIMMELBH	2	1	2	1	0.03	-1	0
HYDC20LS	99	10000	10001	1189560	2746.28	0.054069	1
JENSMP	2	9	10	14	0.14	124.36	0
KOWOSB	4	10	11	20	0.15	0.0003078	0
LIARWHD	100	13	14	37	0.32	9.0888e-21	0
LIARWHD	36	10	11	32	0.18	1.1625e-16	0
LIARWHD	500	15	16	36	0.78	3.7352e-14	0
LOGROS	2	38	39	54	0.53	3.6105e-11	0
MANCINO	100	15	16	23	17.73	9.2449e-18	0
MOREBV	10	2	3	4	0.05	6.582e-14	0
MOREBV	100	1	2	2	0.07	7.887e-10	0
MOREBV	500	1	2	2	0.22	5.9316e-12	0
MSQRTALS	100	17	18	245	1.60	5.5682e-10	0

Table 192: NMTR2 with band preconditioning and $h = 15$ on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.23	6.2623e-12	0
MSQRTALS	49	19	20	143	0.58	1.3997e-10	0
MSQRTBLS	100	19	20	255	1.71	1.6921e-09	0
MSQRTBLS	49	17	18	161	0.58	2.0502e-10	0
MSQRTBLS	9	13	14	36	0.21	4.8784e-11	0
NCB20B	100	22	23	931	5.44	196.68	0
NCB20B	50	18	19	458	1.27	99.504	0
NCB20B	500	21	22	727	29.97	897.52	0
NONDIA	100	19	20	47	0.41	2.898e-15	0
NONDIA	50	17	18	40	0.30	4.9376e-13	0
NONDIA	500	18	19	42	0.86	2.4158e-10	0
NONDQUAR	100	15	16	37	0.33	2.2854e-09	0
NONDQUAR	500	16	17	36	0.73	3.9386e-09	0
NONMSQRT	100	—	—	—	—	—	6
NONMSQRT	49	—	—	—	—	—	6
NONMSQRT	9	63	64	168	0.98	0.75193	0
OSBORNEA	5	40	41	92	0.66	5.4679e-05	0
OSBORNEB	11	19	20	78	0.53	0.040138	0
PALMER1C	8	20	21	174	0.38	0.097605	0
PALMER1D	7	14	15	56	0.25	0.65267	0
PALMER2C	8	19	20	200	0.36	0.014369	0
PALMER3C	8	11	12	78	0.21	0.019539	0
PALMER4C	8	24	25	215	0.43	0.050312	0
PENALTY1	10	23	24	69	0.38	7.0993e-05	0
PENALTY1	100	33	34	243	0.90	0.00090254	0
PENALTY1	50	31	32	246	0.64	0.00043182	0
PENALTY1	500	39	40	217	5.04	0.0047791	0
PENALTY2	10	69	70	240	1.06	0.00029386	0
PENALTY2	100	19	20	87	0.58	97096	0
PENALTY2	50	23	24	117	0.51	4.2961	0
PENALTY3	100	22	23	55	20.38	0.001	0
PENALTY3	50	21	22	56	4.00	0.001	0
PFIT1LS	3	88	89	160	1.28	4.5882e-08	0
POWELLSG	100	15	16	30	0.34	2.1902e-07	0
POWELLSG	500	15	16	30	0.66	1.1139e-06	0
POWELLSG	20	15	16	30	0.24	4.0054e-08	0
POWELLSG	4	15	16	30	0.25	4.2527e-09	0
POWER	10	16	17	40	0.26	1.1098e-08	0
POWER	100	22	23	66	0.49	5.0264e-09	0
POWER	50	19	20	54	0.36	2.3411e-08	0
POWER	500	26	27	78	2.45	5.9786e-09	0
QUARTC	100	26	27	47	0.52	4.5801e-07	0

Table 193: NMTR2 with band preconditioning and $h = 15$ on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.36	5.2022e-08	0
QUARTC	500	33	34	59	1.31	5.8379e-07	0
ROSENBR	2	26	27	45	0.37	3.2328e-13	0
S308	2	10	11	16	0.16	0.7732	0
SCHMVETT	10	3	4	6	0.06	-24	0
SCHMVETT	500	3	4	6	0.36	-1494	0
SCHMVETT	3	3	4	6	0.05	-3	0
SCHMVETT	500	3	4	6	0.37	-1494	0
SINQUAD	100	40	41	140	0.94	4.1555e-08	0
SINQUAD	5	11	12	22	0.18	1.1721e-08	0
SINQUAD	50	33	34	124	0.64	1.4352e-07	0
SINQUAD	500	51	52	158	2.99	1.9161e-08	0
SISSER	2	12	13	19	0.18	1.1139e-08	0
SNAIL	2	72	73	129	0.68	3.2287e-13	0
SPMSRTLS	100	14	15	26	0.38	3.2303e-13	0
SPMSRTLS	28	12	13	22	0.22	3.2953e-16	0
SPMSRTLS	499	20	21	39	1.52	1.9096e-16	0
SROSENBR	10	6	7	10	0.12	4.6748e-17	0
SROSENBR	100	6	7	10	0.16	4.6748e-16	0
SROSENBR	50	6	7	10	0.13	2.3374e-16	0
SROSENBR	500	10	11	20	0.49	2.9154e-13	0
TOINTGOR	50	9	10	84	0.22	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.08	10	0
TOINTGSS	50	2	3	4	0.05	10	0
TOINTGSS	500	2	3	4	0.24	10	0
TOINTPSP	50	23	24	88	0.45	225.56	0
TOINTQOR	50	6	7	30	0.15	1175.5	0
TQUARTIC	100	12	13	35	0.28	2.7682e-11	0
TQUARTIC	5	1	2	2	0.03	4.4373e-31	0
TQUARTIC	50	10	11	35	0.20	5.2793e-13	0
TQUARTIC	500	15	16	42	0.76	4.787e-15	0
TRIDIA	10	1	2	2	0.04	1.0805e-30	0
TRIDIA	100	2	3	3	0.09	1.352e-32	0
TRIDIA	50	2	3	3	0.08	1.352e-32	0
TRIDIA	500	2	3	3	0.27	1.3482e-32	0
VARDIM	10	14	15	14	0.22	1.595e-26	0
VARDIM	100	25	26	25	0.59	5.171e-26	0
VARDIM	50	22	23	22	0.41	1.2641e-27	0
VARDIM	500	33	34	33	5.06	1.1634e-25	0
VAREIGVL	10	36	37	156	0.56	7.2928e-12	0
VAREIGVL	100	12	13	84	0.39	3.3727e-09	0

Table 194: NMTR2 with band preconditioning and $h = 15$ on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	79	0.30	2.9295e-10	0
VAREIGVL	500	12	13	63	1.60	2.0175e-08	0
VIBRBEAM	8	31	32	104	0.69	0.15647	3
WATSON	12	8	9	44	0.22	7.76e-08	0
WATSON	31	10	11	57	0.36	5.0956e-08	0
WOODS	100	15	16	28	0.33	2.0135e-17	0
WOODS	4	15	16	28	0.24	8.0539e-19	0
WOODS	500	16	17	31	0.74	9.8289e-15	0
YFITU	3	29	30	62	0.45	2.5171e-11	0
ZANGWIL2	2	1	2	1	0.03	-18.2	0
PFIT2LS	3	52	53	86	0.75	2.9525e-11	0
PFIT3LS	3	39	40	65	0.56	4.0587e-11	0
PFIT4LS	3	40	41	63	0.59	1.5038e-10	0
EXTROSNB	10	75	76	156	1.12	1.1572e-07	0
EXTROSNB	50	78	79	155	1.35	6.0631e-07	0
EXTROSNB	100	70	71	139	1.45	8.7683e-07	0

Table 195: NMTR2 with band preconditioning and $h = 15$ on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	0.72	1.6903e-10	0
ARWHEAD	5000	5	6	6	5.16	1.11e-12	0
BDQRTIC	1000	11	12	24	1.58	3983.8	0
BROYDN7D	1000	54	55	133	4.65	346.59	0
BRYBND	1000	16	17	46	2.50	1.8775e-12	0
BRYBND	5000	23	24	71	17.81	1.8862e-13	0
CRAGGLVY	1000	14	15	25	1.54	336.42	0
CRAGGLVY	5000	14	15	26	7.53	1688.2	0
DIXMAANA	1500	5	6	15	0.95	1	0
DIXMAANA	3000	5	6	15	1.91	1	0
DIXMAANB	1500	7	8	14	1.09	1	0
DIXMAANB	3000	7	8	14	2.17	1	0
DIXMAANC	1500	17	18	28	1.98	1	0
DIXMAANC	3000	14	15	27	3.63	1	0
DIXMAAND	1500	9	10	21	1.29	1	0
DIXMAAND	3000	11	12	24	2.91	1	0
DIXMAANE	1500	6	7	17	1.05	1	0
DIXMAANE	3000	6	7	17	2.08	1	0
DIXMAANF	1500	25	26	46	2.76	1	0
DIXMAANF	3000	51	52	97	9.56	1	0
DIXMAANG	1500	39	40	76	3.91	1	0
DIXMAANG	3000	57	58	111	10.53	1	0
DIXMAANH	1500	44	45	93	4.51	1	0
DIXMAANH	3000	33	34	67	7.10	1	0
DIXMAANI	1500	7	8	23	1.16	1	0
DIXMAANI	3000	7	8	29	2.46	1	0
DIXMAANJ	1500	29	30	62	3.06	1	0
DIXMAANJ	3000	42	43	100	8.41	1	0
DIXMAANK	1500	58	59	204	6.49	1	0
DIXMAANK	3000	32	33	69	6.47	1	0
DIXMAANL	1500	28	29	66	2.91	1	0
DIXMAANL	3000	98	99	198	17.38	1	0
DQDRTIC	1000	2	3	2	0.41	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.91	1.6602e-23	0
DQRTIC	1000	35	36	62	2.36	3.6952e-06	0
DQRTIC	5000	42	43	73	12.90	7.0042e-06	0
EDENSCH	2000	12	13	21	2.44	12003	0
EIGENALS	930	43	44	160	79.58	2.5686e-11	0
EIGENBLS	930	169	170	11913	1651.40	4.088e-08	0
ENGVAL1	1000	7	8	14	0.82	1108.2	0
ENGVAL1	5000	7	8	14	3.89	5548.7	0
FLETCBV2	1000	0	1	0	0.33	-0.50134	0

Table 196: NMTR2 with band preconditioning and $h = 15$ on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1021.83	-1.8877e+06	1
FMINSURF	1024	317	318	800	106.24	1	0
FMINSURF	5625	284	285	863	2205.03	1	0
FREUROTH	1000	10	11	17	1.07	121470	0
FREUROTH	5000	10	11	17	5.11	608160	0
LIARWHD	1000	14	15	35	1.26	2.0274e-20	0
LIARWHD	5000	13	14	28	5.66	6.0958e-16	0
MOREBV	1000	1	2	2	0.40	7.3289e-13	0
MOREBV	5000	1	2	2	1.86	5.8478e-15	0
MSQRTALS	1024	40	41	3939	588.78	3.8787e-09	0
MSQRTALS	529	21	22	1985	88.70	4.0963e-08	0
MSQRTBLS	529	20	21	2188	96.26	2.4397e-08	0
MSQRTBLS	1024	33	34	2175	328.75	9.9704e-09	0
NCB20B	1000	22	23	590	50.28	1676	0
NONDIA	1000	21	22	51	1.65	3.9681e-10	0
NONDIA	5000	32	33	80	11.04	5.0265e-15	0
NONDIA	10000	33	34	81	22.84	1.2547e-07	0
NONDQUAR	1000	17	18	36	1.24	1.3932e-09	0
NONDQUAR	5000	18	19	37	5.91	1.0076e-09	0
NONDQUAR	10000	19	20	38	12.41	5.2266e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	45	46	285	17.19	0.0096862	0
POWELLSG	1000	15	16	30	1.07	2.2324e-06	0
POWELLSG	5000	15	16	32	4.87	5.2976e-06	0
POWELLSG	10000	15	16	32	9.83	1.0595e-05	0
POWER	1000	27	28	80	7.52	1.8888e-08	0
QUARTC	1000	35	36	62	2.37	3.6952e-06	0
QUARTC	5000	42	43	73	13.00	7.0042e-06	0
QUARTC	10000	45	46	78	27.39	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.74	-2994	0
SCHMVETT	5000	3	4	6	3.45	-14994	0
SCHMVETT	10000	3	4	6	6.91	-29994	0
SINQUAD	1000	55	56	170	6.23	1.5962e-08	0
SINQUAD	5000	77	78	222	61.56	2.7421e-08	0
SINQUAD	10000	87	88	254	156.37	2.4936e-08	0
SPMSRTLS	1000	27	28	58	3.56	1.1147e-15	0
SPMSRTLS	4999	32	33	71	20.64	5.1698e-12	0
SPMSRTLS	10000	72	73	149	82.92	8.848e-15	0
SROSENBR	1000	10	11	20	0.83	5.8309e-13	0
SROSENBR	5000	10	11	20	3.80	2.9154e-12	0
SROSENBR	10000	10	11	20	7.68	5.8309e-12	0
TESTQUAD	1000	5	6	19	0.57	7.6524e-11	0

Table 197: NMTR2 with band preconditioning and $h = 15$ on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.44	10	0
TOINTGSS	5000	2	3	4	2.08	10	0
TOINTGSS	10000	2	3	4	4.17	10	0
TQUARTIC	1000	12	13	36	1.17	2.9487e-11	0
TQUARTIC	5000	20	21	51	9.98	1.1107e-10	0
TQUARTIC	10000	18	19	44	23.15	3.5718e-15	0
TRIDIA	1000	2	3	3	0.48	1.3827e-32	0
TRIDIA	5000	2	3	3	2.26	4.1976e-33	0
TRIDIA	10000	2	3	3	4.53	5.3451e-33	0
VARDIM	1000	36	37	36	18.80	1.1203e-20	0
VARDIM	5000	45	46	45	546.46	1.1459e-18	0
VAREIGVL	1000	12	13	70	4.47	5.6139e-08	0
VAREIGVL	5000	13	14	59	83.50	7.7013e-08	0
WOODS	1000	16	17	31	1.25	1.9658e-14	0
WOODS	10000	16	17	31	12.01	1.9658e-13	0
FLETCHCR	1000	1321	1322	2642	79.11	1.5315e-20	0
GENROSE	1000	451	452	1033	26.70	1	0

Table 198: NMTR2 with band preconditioning and $h = 15$ on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	87	88	4072	23.36	0	0
CATENARY	501	453	454	13063	64.10	-348400	0
CHANDHEQ	100	13	14	62	6.78	6.7959e-08	0
CHEMRCTA	100	36	37	608	1.25	5.102e-15	0
CHEMRCTB	1000	52	53	165	6.24	6.1367e-20	0
CLPLATEC	5041	3	4	3935	199.58	-0.0050207	0
CORKSCRW	456	129	130	76738	223.02	26.484	0
DALLASM	196	82	83	15783	24.92	-48198	0
DISCS	36	117	118	3477	6.69	12	0
DRUGDIS	304	211	212	3821	19.48	4.2452	0
DTOC5	9999	25	26	91	46.62	1.5316	0
EXPFITB	5	62	63	902	2.51	0.0050193	0
EXPFITC	5	84	85	1696	13.73	0.023303	0
FCCU	19	16	17	57	0.32	11.149	0
FLETCHER	4	32	33	65	0.52	19.525	0
GILBERT	500	29	30	71	3.42	237.37	0
GRIDNETA	3444	35	36	3753	90.89	161.61	0
GRIDNETE	3444	27	28	2939	104.51	144.06	0
HADAMARD	257	304	305	22628	284.67	1	0
HAGER3	2001	12	13	32	4.18	0.14096	0
HAGER4	2001	11	12	2294	46.20	2.7942	0
HS114	10	391	392	2304	6.14	-1768.8	0
HS59	2	168	169	348	2.52	-7.8028	0
HS75	4	136	137	543	2.02	5174.4	0
HVYCRASH	204	173	174	2311	8.89	-0.2185	0
HYDROELL	1009	143	144	22557	254.62	-3.5855e+06	0
JUNKTURN	5010	62	63	798	71.05	9.4616e-06	0
KSIP	20	69	70	3794	66.08	0.57579	0
LINVERSE	1999	25	26	963	43.62	681	0
LMINSURF	1024	362	363	948	34.21	9	0
MANNE	300	6	7	75	0.98	-0.97457	0
MEYER3	3	103	104	242	1.54	87.946	0
MINPERM	51	18	19	141	0.52	0.0384	0
MISTAKE	9	31	32	196	0.59	-1	0
NGONE	50	498	499	13159	72.13	-0.64103	0
NLMSURF	1024	1158	1159	3136	109.78	38.591	0
NYSTROM5	18	28	29	453	0.65	2.4426e-05	0
ODC	10404	19	20	916	143.91	-0.0040122	0
OET1	3	38	39	974	13.46	0.53824	0
OPTCTRL3	122	61	62	249	1.71	2048	0
ORTHREGA	2053	172	173	897	60.43	5661.4	0
ORTHREGC	5005	61	62	401	64.53	94.813	0

Table 199: NMTR2 with band preconditioning and $h = 15$ on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	113	114	685	3.23	15.59	0
ORTHREGF	1205	258	259	611	30.55	27.809	0
PRODPL1	60	57	58	1140	1.53	35.739	0
QR3D	610	123	124	13934	397.23	1.1139e-08	0
QR3DBD	457	79	80	1338	36.36	2.6819e-10	0
READING1	202	338	339	8716	27.22	-0.16049	0
SEMICON1	102	398	399	803	13.24	7.0312e-16	0
SEMICON2	1002	134	135	261	28.89	1.6734e-06	0
SIPOW1	2	40	41	1239	31.99	-1	0
SPANHYD	97	59	60	2716	3.18	239.74	0
SSC	10404	1	2	93	28.43	-2.0782	0
SSEBNLN	194	66	67	1451	3.33	1.6171e+07	0
SSNLBEAM	3003	239	240	7246	277.52	340.03	0
STEENBRE	540	2649	2650	113030	236.06	27465	0
TENBARS1	18	409	410	5196	7.57	2295.4	0
TENBARS2	18	215	216	1624	3.71	2277.9	0
TRAINF	408	43	44	1275	5.45	3.0975	0
TRUSPYR1	11	461	462	2185	7.48	11.229	0
UBH5	1010	60	61	18864	117.31	1.1163	0
WATER	31	39	40	375	0.78	10549	0
ZIGZAG	304	89	90	17835	43.88	33.787	0

Table 200: NMTR2 with band preconditioning and $h = 15$ on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	10	11	21	0.16	5.7444	0
ARWHEAD	100	5	6	9	0.14	0	0
ARWHEAD	500	5	6	7	0.32	1.3224e-09	0
BARD	3	13	14	44	0.18	0.0082149	0
BDQRTIC	100	12	13	68	0.30	378.77	0
BDQRTIC	500	12	13	78	0.86	1981	0
BEALE	2	5	6	12	0.09	6.2362e-16	0
BIGGS6	6	19	20	78	0.30	0.0056557	0
BOX3	3	7	8	21	0.13	1.641e-09	0
BRKMCC	2	4	5	9	0.08	0.16904	0
BROWNAL	10	4	5	10	0.08	1.1263e-10	0
BROWNBS	2	24	25	53	0.35	0	0
BROWNDEN	4	11	12	35	0.18	85822	0
BROYDN7D	10	21	22	99	0.31	1.2611	0
BROYDN7D	100	21	22	111	0.46	39.355	0
BROYDN7D	500	61	62	335	2.69	189.25	0
BRYBND	10	11	12	81	0.18	5.0386e-17	0
BRYBND	100	10	11	110	0.33	4.9725e-13	0
BRYBND	500	10	11	119	1.09	5.2269e-13	0
CHNROSNB	10	30	31	176	0.47	4.3569e-19	0
CLIFF	2	28	29	34	0.40	0.19979	0
CRAGGLVY	100	13	14	177	0.38	32.27	0
CRAGGLVY	4	17	18	67	0.27	4.2291e-08	0
CRAGGLVY	500	13	14	179	1.05	167.45	0
CUBE	2	37	38	98	0.50	1.6006e-14	0
DENSCHNA	2	5	6	11	0.09	6.6698e-14	0
DENSCHNB	2	5	6	8	0.09	7.604e-16	0
DENSCHNC	2	9	10	17	0.14	8.7828e-13	0
DENSCHND	3	28	29	89	0.41	1.0203e-07	0
DENSCHNE	3	16	17	23	0.24	1.3646e-12	0
DENSCHNF	2	6	7	16	0.11	2.8929e-18	0
DIXMAANA	15	6	7	14	0.08	1	0
DIXMAANA	90	5	6	14	0.10	1	0
DIXMAANA	300	5	6	14	0.20	1	0
DIXMAANB	15	6	7	19	0.09	1	0
DIXMAANB	90	6	7	20	0.12	1	0
DIXMAANB	300	6	7	19	0.23	1	0
DIXMAANC	15	7	8	21	0.08	1	0
DIXMAANC	90	7	8	21	0.13	1	0
DIXMAANC	300	7	8	22	0.25	1	0
DIXMAAND	15	8	9	25	0.11	1	0
DIXMAAND	90	8	9	25	0.14	1	0

Table 201: Unpreconditioned NMTR2 on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	8	9	26	0.27	1	0
DIXMAANE	15	7	8	36	0.09	1	0
DIXMAANE	90	8	9	69	0.17	1	0
DIXMAANE	300	8	9	117	0.39	1	0
DIXMAANF	15	10	11	43	0.11	1	0
DIXMAANF	90	13	14	83	0.24	1	0
DIXMAANF	300	14	15	128	0.58	1	0
DIXMAANG	15	11	12	49	0.12	1	0
DIXMAANG	90	16	17	87	0.27	1	0
DIXMAANG	300	12	13	122	0.54	1	0
DIXMAANH	15	12	13	48	0.15	1	0
DIXMAANH	90	14	15	86	0.24	1	0
DIXMAANH	300	18	19	148	0.66	1	0
DIXMAANI	15	7	8	62	0.09	1	0
DIXMAANI	90	7	8	295	0.27	1	0
DIXMAANI	300	7	8	969	1.72	1	0
DIXMAANJ	15	12	13	84	0.14	1	0
DIXMAANJ	90	22	23	446	0.52	1	0
DIXMAANJ	300	25	26	579	1.56	1	0
DIXMAANK	15	12	13	66	0.14	1	0
DIXMAANK	90	17	18	213	0.34	1	0
DIXMAANK	300	26	27	500	1.44	1	0
DIXMAANL	15	12	13	69	0.15	1	0
DIXMAANL	90	20	21	243	0.40	1	0
DIXMAANL	300	29	30	1087	2.54	1	0
DIXON3DQ	10	3	4	27	0.07	5.3002e-31	0
DJTL	2	62	63	98	0.83	-8951.5	0
DQDRTIC	10	2	3	2	0.05	1.6602e-23	0
DQDRTIC	100	2	3	2	0.08	1.6602e-23	0
DQDRTIC	500	2	3	2	0.22	1.6602e-23	0
DQRTIC	100	26	27	116	0.49	4.9878e-07	0
DQRTIC	500	33	34	195	1.34	6.084e-07	0
EDENSCH	36	13	14	46	0.23	219.28	0
EIGENALS	110	15	16	157	0.71	2.7564e-11	0
EIGENALS	420	25	26	406	9.28	1.1461e-09	0
EIGENBLS	110	74	75	1552	7.33	7.818e-11	0
EIGENBLS	420	95	96	5195	172.56	8.8645e-10	0
EIGENCLS	462	79	80	2139	87.23	2.9854e-11	0
ENGVAL1	100	7	8	27	0.18	109.09	0
ENGVAL1	2	7	8	17	0.12	0	0
ERRINROS	10	40	41	230	0.62	6.6946	0
ERRINROS	50	40	41	396	0.78	39.904	0

Table 202: Unpreconditioned NMTR2 on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	25	0.19	0.24051	0
EXTROSNB	5	38	39	181	0.58	2.5147e-10	0
FLETCBV2	100	1	2	101	0.12	-0.51401	0
FLETCBV3	100	10000	10001	19540	178.59	-5578.5	1
FLETCHBV	10	310	311	683	4.31	-2.5742e+06	0
FLETCHBV	100	10000	10001	20034	173.95	-5.7893e+11	1
FLETCHCR	10	28	29	178	0.40	2.4577e-11	0
FLETCHCR	100	144	145	1583	3.03	9.0153e-14	0
FMINSURF	121	52	53	197	1.17	1	0
FMINSURF	16	15	16	51	0.23	1	0
FREUROTH	100	10	11	38	0.24	11965	0
FREUROTH	2	9	10	21	0.14	48.984	0
FREUROTH	50	10	11	38	0.19	5881	0
FREUROTH	500	10	11	38	0.53	60634	0
GENROSE	10	27	28	173	0.39	1	0
GENROSE	100	92	93	628	1.84	1	0
GENROSE	500	366	367	2695	14.47	1	0
GROWTHLS	3	71	72	203	1.01	1.004	0
GULF	3	22	23	56	0.43	8.2745e-11	0
HAIRY	2	73	74	123	0.63	20	0
HATFLDD	3	14	15	48	0.21	6.6879e-08	0
HATFLDE	3	15	16	50	0.24	5.1327e-07	0
HEART6LS	6	573	574	1662	8.06	2.0294e-11	0
HELIX	3	14	15	46	0.21	1.3413e-16	0
HILBERTA	2	2	3	2	0.04	6.656e-31	0
HILBERTB	5	2	3	2	0.04	1.5953e-29	0
HIMMELBB	2	21	22	24	0.32	8.3214e-11	0
HIMMELBF	4	176	177	737	2.53	318.57	0
HIMMELBG	2	8	9	12	0.09	7.139e-13	0
HIMMELBH	2	1	2	1	0.03	-1	0
HYDC20LS	99	10000	10001	2721525	5195.20	0.16833	1
JENSMP	2	9	10	23	0.16	124.36	0
KOWOSB	4	15	16	60	0.23	0.0003078	0
LIARWHD	100	10	11	28	0.22	1.2325e-15	0
LIARWHD	36	10	11	26	0.19	4.3062e-17	0
LIARWHD	500	11	12	29	0.50	4.4222e-19	0
LOGROS	2	43	44	83	0.58	9.4147e-14	0
MANCINO	100	11	12	24	11.43	4.3367e-17	0
MOREBV	10	3	4	30	0.07	2.6552e-12	0
MOREBV	100	5	6	1227	0.73	6.7615e-07	0
MOREBV	500	2	3	401	1.15	9.4938e-09	0
MSQRTALS	100	24	25	540	2.45	2.707e-11	0

Table 203: Unpreconditioned NMTR2 on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	50	0.21	5.0588e-10	0
MSQRTALS	49	21	22	232	0.62	9.4651e-12	0
MSQRTBLS	100	35	36	739	3.27	2.6036e-09	0
MSQRTBLS	49	18	19	259	0.59	1.3055e-10	0
MSQRTBLS	9	12	13	46	0.19	7.4629e-12	0
NCB20B	100	21	22	804	4.36	196.68	0
NCB20B	50	11	12	253	0.64	99.504	0
NCB20B	500	26	27	1017	38.08	897.52	0
NONDIA	100	18	19	35	0.34	5.8322e-14	0
NONDIA	50	11	12	21	0.20	1.5573e-14	0
NONDIA	500	19	20	39	0.70	1.791e-19	0
NONDQUAR	100	42	43	665	0.90	2.4953e-06	0
NONDQUAR	500	56	57	926	2.87	2.6542e-06	0
NONMSQRT	100	152	153	7772	25.78	18.055	0
NONMSQRT	49	105	106	2843	4.36	1.0755	0
NONMSQRT	9	46	47	280	0.70	0.752	0
OSBORNEA	5	22	23	82	0.34	5.5194e-05	0
OSBORNEB	11	25	26	193	0.63	0.040138	0
PALMER1C	8	74	75	1627	1.32	0.097605	0
PALMER1D	7	34	35	468	0.56	0.65267	0
PALMER2C	8	16	17	262	0.30	0.01437	0
PALMER3C	8	49	50	992	0.84	0.019538	0
PALMER4C	8	37	38	719	0.65	0.050311	0
PENALTY1	10	19	20	27	0.28	7.1153e-05	0
PENALTY1	100	33	34	50	0.61	0.00090254	0
PENALTY1	50	29	30	47	0.47	0.00043227	0
PENALTY1	500	39	40	55	2.41	0.0047791	0
PENALTY2	10	15	16	49	0.22	0.00029523	0
PENALTY2	100	18	19	168	0.51	97096	0
PENALTY2	50	23	24	129	0.44	4.2961	0
PENALTY3	100	20	21	80	15.91	0.00099997	0
PENALTY3	50	19	20	79	2.91	0.001	0
PFIT1LS	3	172	173	427	2.31	3.575e-07	0
POWELLSG	100	15	16	74	0.30	1.4205e-07	0
POWELLSG	500	15	16	74	0.57	7.1025e-07	0
POWELLSG	20	15	16	73	0.27	3.5465e-08	0
POWELLSG	4	15	16	72	0.22	1.1266e-08	0
POWER	10	16	17	67	0.25	3.1417e-08	0
POWER	100	22	23	207	0.47	1.4132e-08	0
POWER	50	20	21	141	0.35	2.3657e-08	0
POWER	500	26	27	453	1.44	1.0025e-08	0
QUARTC	100	26	27	116	0.50	4.9878e-07	0

Table 204: Unpreconditioned NMTR2 on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	55	0.34	8.3381e-08	0
QUARTC	500	33	34	195	1.33	6.084e-07	0
ROSENBR	2	24	25	53	0.35	3.8882e-13	0
S308	2	9	10	19	0.14	0.7732	0
SCHMVETT	10	3	4	28	0.05	-24	0
SCHMVETT	500	3	4	50	0.53	-1494	0
SCHMVETT	3	3	4	11	0.04	-3	0
SCHMVETT	500	3	4	50	0.53	-1494	0
SINQUAD	100	29	30	77	0.57	9.5852e-07	0
SINQUAD	5	19	20	64	0.28	1.0628e-07	0
SINQUAD	50	23	24	69	0.39	5.9039e-07	0
SINQUAD	500	41	42	106	1.67	1.193e-06	0
SISSER	2	12	13	17	0.19	1.3906e-08	0
SNAIL	2	74	75	161	0.70	4.7879e-20	0
SPMSRTLS	100	12	13	85	0.36	3.9581e-11	0
SPMSRTLS	28	12	13	56	0.21	6.0836e-12	0
SPMSRTLS	499	16	17	129	1.49	2.0993e-11	0
SROSENBR	10	10	11	30	0.16	6.6723e-14	0
SROSENBR	100	10	11	30	0.20	6.6723e-13	0
SROSENBR	50	10	11	30	0.18	3.3361e-13	0
SROSENBR	500	10	11	30	0.41	3.3361e-12	0
TOINTGOR	50	8	9	125	0.19	1373.9	0
TOINTGSS	10	14	15	69	0.16	10	0
TOINTGSS	100	8	9	27	0.14	10.102	0
TOINTGSS	50	12	13	41	0.15	10.208	0
TOINTGSS	500	8	9	23	0.32	10.02	0
TOINTPSP	50	50	51	174	0.77	225.56	0
TOINTQOR	50	5	6	39	0.12	1175.5	0
TQUARTIC	100	11	12	21	0.22	1.1899e-14	0
TQUARTIC	5	9	10	17	0.15	9.1239e-19	0
TQUARTIC	50	9	10	17	0.16	9.6241e-10	0
TQUARTIC	500	12	13	26	0.49	4.4191e-15	0
TRIDIA	10	5	6	29	0.10	5.687e-12	0
TRIDIA	100	4	5	95	0.15	8.5487e-14	0
TRIDIA	50	4	5	79	0.12	9.9326e-14	0
TRIDIA	500	4	5	95	0.42	8.5487e-14	0
VARDIM	10	14	15	14	0.22	1.595e-26	0
VARDIM	100	25	26	25	0.45	5.171e-26	0
VARDIM	50	22	23	22	0.36	1.2641e-27	0
VARDIM	500	33	34	33	0.88	1.1634e-25	0
VAREIGVL	10	10	11	63	0.16	4.2007e-09	0
VAREIGVL	100	11	12	92	0.30	1.5303e-08	0

Table 205: Unpreconditioned NMTR2 on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	11	12	120	0.25	9.1854e-09	0
VAREIGVL	500	12	13	110	0.90	1.7608e-08	0
VIBRBEAM	8	111	112	1082	2.55	2.7175	0
WATSON	12	9	10	50	0.20	9.3046e-08	0
WATSON	31	9	10	53	0.22	3.0439e-08	0
WOODS	100	16	17	64	0.32	1.6135e-15	0
WOODS	4	16	17	56	0.25	1.7832e-17	0
WOODS	500	16	17	65	0.65	2.5478e-15	0
YFITU	3	28	29	88	0.42	1.4448e-07	0
ZANGWIL2	2	1	2	1	0.03	-18.2	0
PFIT2LS	3	34	35	77	0.47	1.568e-09	0
PFIT3LS	3	38	39	84	0.54	1.1402e-09	0
PFIT4LS	3	54	55	115	0.79	2.5859e-09	0
EXTROSNB	10	77	78	511	1.15	7.4916e-07	0
EXTROSNB	50	73	74	584	1.25	9.6935e-07	0
EXTROSNB	100	77	78	621	1.50	1.396e-06	0

Table 206: Unpreconditioned NMTR2 on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	7	0.60	1.6903e-10	0
ARWHEAD	5000	5	6	7	4.50	1.11e-12	0
BDQRTIC	1000	12	13	78	1.65	3983.8	0
BROYDN7D	1000	94	95	551	6.88	383.61	0
BRYBND	1000	13	14	190	3.05	2.8797e-13	0
BRYBND	5000	18	19	237	20.47	9.5322e-13	0
CRAGGLVY	1000	13	14	179	1.96	336.42	0
CRAGGLVY	5000	13	14	179	11.13	1688.2	0
DIXMAANA	1500	5	6	14	0.75	1	0
DIXMAANA	3000	4	5	12	1.40	1	0
DIXMAANB	1500	6	7	19	0.87	1	0
DIXMAANB	3000	6	7	19	1.72	1	0
DIXMAANC	1500	7	8	22	0.94	1	0
DIXMAANC	3000	7	8	22	1.87	1	0
DIXMAAND	1500	8	9	27	1.01	1	0
DIXMAAND	3000	8	9	26	2.03	1	0
DIXMAANE	1500	8	9	219	2.49	1	0
DIXMAANE	3000	8	9	284	6.42	1	0
DIXMAANF	1500	16	17	199	3.08	1	0
DIXMAANF	3000	16	17	242	7.04	1	0
DIXMAANG	1500	15	16	204	3.07	1	0
DIXMAANG	3000	19	20	286	8.58	1	0
DIXMAANH	1500	18	19	274	3.88	1	0
DIXMAANH	3000	19	20	304	9.10	1	0
DIXMAANI	1500	7	8	3032	25.40	1	0
DIXMAANI	3000	7	8	5640	101.30	1	0
DIXMAANJ	1500	26	27	2044	21.19	1	0
DIXMAANJ	3000	68	69	3469	77.79	1	0
DIXMAANK	1500	74	75	2230	24.92	1	0
DIXMAANK	3000	78	79	3123	71.26	1	0
DIXMAANL	1500	65	66	2120	23.41	1	0
DIXMAANL	3000	51	52	3188	71.14	1	0
DQDRTIC	1000	2	3	2	0.38	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.77	1.6602e-23	0
DQRTIC	1000	35	36	258	2.60	3.7687e-06	0
DQRTIC	5000	42	43	410	15.86	6.9762e-06	0
EDENSCH	2000	14	15	50	2.35	12003	0
EIGENALS	930	45	46	969	74.13	9.5883e-10	0
EIGENBLS	930	122	123	10613	1212.62	5.0072e-09	0
ENGVAL1	1000	7	8	27	0.70	1108.2	0
ENGVAL1	5000	7	8	27	3.37	5548.7	0
FLETCBV2	1000	0	1	0	0.32	-0.50134	0

Table 207: Unpreconditioned NMTR2 on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	10010	900.92	-1.8877e+06	1
FMINSURF	1024	209	210	760	18.79	1	0
FMINSURF	5625	417	418	1651	303.26	1	0
FREUROTH	1000	28	29	67	1.66	121470	3
FREUROTH	5000	10	11	38	4.64	608160	0
LIARWHD	1000	13	14	27	0.86	2.3011e-16	0
LIARWHD	5000	13	14	23	3.85	6.0958e-16	0
MOREBV	1000	2	3	267	1.58	2.0186e-09	0
MOREBV	5000	1	2	76	4.05	3.0225e-10	0
MSQRTALS	1024	103	104	12493	1630.16	2.6199e-10	0
MSQRTALS	529	83	84	9018	344.93	1.6277e-09	0
MSQRTBLS	529	74	75	6072	236.15	2.7947e-09	0
MSQRTBLS	1024	81	82	7752	1034.17	3.147e-09	0
NCB20B	1000	21	22	1542	110.47	1676	0
NONDIA	1000	23	24	44	1.30	3.4776e-13	0
NONDIA	5000	29	30	60	6.92	1.9076e-07	0
NONDIA	10000	32	33	66	14.98	1.2691e-07	0
NONDQUAR	1000	54	55	1012	5.21	2.9692e-06	0
NONDQUAR	5000	72	73	1492	38.20	2.3118e-06	0
NONDQUAR	10000	67	68	1398	77.63	2.7959e-06	0
NONMSQRT	529	181	182	29912	943.97	61.328	0
PENALTY1	1000	45	46	69	7.16	0.0096862	0
POWELLSG	1000	15	16	75	0.95	1.1167e-06	0
POWELLSG	5000	15	16	75	4.20	5.5837e-06	0
POWELLSG	10000	15	16	77	8.61	1.1167e-05	0
POWER	1000	28	29	641	3.23	5.8399e-09	0
QUARTC	1000	35	36	258	2.70	3.7687e-06	0
QUARTC	5000	42	43	410	15.89	6.9762e-06	0
QUARTC	10000	45	46	511	37.86	8.6633e-06	0
SCHMVETT	1000	3	4	50	1.29	-2994	0
SCHMVETT	5000	3	4	49	5.32	-14994	0
SCHMVETT	10000	3	4	50	10.88	-29994	0
SINQUAD	1000	43	44	106	3.21	2.1133e-06	0
SINQUAD	5000	55	56	124	30.01	1.4288e-05	0
SINQUAD	10000	79	80	175	95.65	2.1531e-05	0
SPMSRTLS	1000	17	18	165	3.39	1.8899e-11	0
SPMSRTLS	4999	63	64	929	70.90	7.4283e-11	0
SPMSRTLS	10000	71	72	795	134.82	1.121e-11	0
SROSENBR	1000	10	11	30	0.67	6.6723e-12	0
SROSENBR	5000	10	11	30	3.05	3.3361e-11	0
SROSENBR	10000	10	11	30	6.06	6.6723e-11	0
TESTQUAD	1000	4	5	26	0.50	2.6707e-12	0

Table 208: Unpreconditioned NMTR2 on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	8	9	23	0.57	10.01	0
TOINTGSS	5000	8	9	21	3.21	10.002	0
TOINTGSS	10000	8	9	21	6.37	10.001	0
TQUARTIC	1000	13	14	27	0.92	1.0168e-16	0
TQUARTIC	5000	12	13	24	5.71	7.2373e-08	0
TQUARTIC	10000	12	13	24	16.09	1.793e-08	0
TRIDIA	1000	4	5	95	0.74	8.5487e-14	0
TRIDIA	5000	4	5	95	3.63	8.5488e-14	0
TRIDIA	10000	4	5	95	7.61	8.5491e-14	0
VARDIM	1000	36	37	36	1.44	1.1203e-20	0
VARDIM	5000	45	46	45	6.78	1.1459e-18	0
VAREIGVL	1000	12	13	136	1.88	5.8152e-08	0
VAREIGVL	5000	13	14	115	11.05	7.6187e-08	0
WOODS	1000	16	17	65	1.07	5.0956e-15	0
WOODS	10000	16	17	66	10.49	4.7618e-14	0
FLETCHCR	1000	1308	1309	15347	107.71	1.5545e-13	0
GENROSE	1000	692	693	5153	45.80	1	0

Table 209: Unpreconditioned NMTR2 on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	37	38	4069	12.33	0	0
CATENARY	501	307	308	114734	323.48	-348400	0
CHANDHEQ	100	13	14	135	4.85	6.9121e-08	0
CHEMRCTA	100	10000	10001	3010000	2044.88	0.33624	8
CHEMRCTB	1000	—	—	—	—	—	6
CLPLATEC	5041	2	3	5634	218.50	-0.0050207	0
CORKSCRW	456	1299	1300	1421814	2174.53	26.484	0
DALLASM	196	278	279	136063	140.30	-48198	0
DISCS	36	10000	10001	1970892	1641.33	15.918	1
DRUGDIS	304	10000	10001	7037995	13725.60	4.3234	1
DTOC5	9999	29	30	100332	6750.32	1.5316	0
EXPFITB	5	55	56	1937	2.50	0.0050193	0
EXPFITC	5	80	81	5005	19.00	0.023303	0
FCCU	19	16	17	102	0.32	11.149	0
FLETCHER	4	27	28	127	0.45	19.525	0
GILBERT	500	27	28	55	1.60	237.37	0
GRIDNETA	3444	28	29	6766	104.43	161.61	0
GRIDNETE	3444	16	17	5038	126.16	144.06	0
HADAMARD	257	626	627	1596817	12039.05	1	3
HAGER3	2001	6	7	4969	66.90	0.14096	0
HAGER4	2001	9	10	163878	1238.01	2.7942	0
HS114	10	1490	1491	33441	26.59	-1768.8	0
HS59	2	210	211	792	2.99	-7.8028	0
HS75	4	1005	1006	15293	15.62	5174.4	0
HVYCRASH	204	10000	10001	4976210	5881.76	-0.065705	1
HYDROELL	1009	137	138	48621	247.35	-3.5855e+06	0
JUNKTURN	5010	66	67	88235	3774.88	9.719e-06	0
KSIP	20	47	48	3086	29.56	0.57579	0
LINVERSE	1999	13	14	1653	49.29	682	0
LMINSURF	1024	570	571	1801	36.64	9	0
MANNE	300	7	8	424	1.46	-0.97457	0
MEYER3	3	101	102	255	1.45	87.946	0
MINPERM	51	10	11	54	0.28	0.0384	0
MISTAKE	9	25	26	229	0.48	-1	0
NGONE	50	428	429	23794	75.08	-0.64103	0
NLMSURF	1024	1955	1956	8106	140.64	38.591	0
NYSTROM5	18	17	18	116	0.30	2.5972e-07	0
ODC	10404	19	20	1527	184.78	-0.0040122	0
OET1	3	43	44	1750	10.97	0.53824	0
OPTCTRL3	122	50	51	3387	3.16	2048	0
ORTHREGA	2053	157	158	2052	70.51	5661.4	0
ORTHREGC	5005	54	55	1191	95.51	94.813	0

Table 210: Unpreconditioned NMTR2 on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	26	27	128	0.69	15.59	0
ORTHREGF	1205	35	36	363	6.27	16.201	0
PRODPL1	60	54	55	1376	1.24	35.739	0
QR3D	610	133	134	13142	333.04	1.929e-08	0
QR3DBD	457	108	109	4619	75.78	2.6093e-10	0
READING1	202	205	206	76837	93.74	-0.16049	0
SEMICON1	102	6417	6418	350505	408.18	3.7497e-07	0
SEMICON2	1002	420	421	895077	4903.82	0.00035674	8
SIPOW1	2	49	50	1222	18.27	-1	0
SPANHYD	97	18	19	584	0.64	239.74	0
SSC	10404	1	2	133	34.88	-2.0782	0
SSEBNLN	194	52	53	3277	2.76	1.6171e+07	0
SSNLBEAM	3003	—	—	—	—	—	6
STEENBRE	540	1506	1507	399894	397.58	27459	0
TENBARS1	18	251	252	3476	4.25	2295.4	0
TENBARS2	18	146	147	1529	2.38	2277.9	0
TRAINF	408	34	35	32374	38.16	3.0975	0
TRUSPYR1	11	477	478	2351	7.06	11.228	0
UBH5	1000	—	—	—	—	—	6
WATER	31	34	35	510	0.62	10549	0
ZIGZAG	304	149	150	129299	134.70	33.787	0

Table 211: Unpreconditioned NMTR2 on constrained problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
ALLINITU	4	9	10	14	0.14	5.7444	0
ARWHEAD	100	5	6	7	0.16	0	0
ARWHEAD	500	5	6	6	0.59	1.3224e-09	0
BARD	3	10	11	19	0.16	0.0082149	0
BDQRTIC	100	11	12	20	0.40	378.77	0
BDQRTIC	500	11	12	20	2.44	1981	0
BEALE	2	7	8	14	0.13	2.9425e-14	0
BIGGS6	6	100	101	229	1.51	3.429e-08	0
BOX3	3	7	8	14	0.12	6.075e-12	0
BRKMCC	2	3	4	5	0.06	0.16904	0
BROWNAL	10	4	5	7	0.09	1.1263e-10	0
BROWNBS	2	39	40	62	0.59	1.9722e-31	0
BROWNDEN	4	11	12	20	0.19	85822	0
BROYDN7D	10	18	19	36	0.28	1.2611	0
BROYDN7D	100	23	24	46	0.60	30.022	0
BROYDN7D	500	26	27	52	1.89	150.87	0
BRYBND	10	12	13	23	0.21	1.9159e-16	0
BRYBND	100	13	14	25	0.46	9.7214e-15	0
BRYBND	500	10	11	22	1.27	2.4154e-19	0
CHNROSNB	10	22	23	44	0.36	6.5468e-12	0
CLIFF	2	27	28	30	0.42	0.19979	0
CRAGGLVY	100	14	15	25	0.36	32.27	0
CRAGGLVY	4	16	17	30	0.25	4.2706e-08	0
CRAGGLVY	500	14	15	25	0.94	167.45	0
CUBE	2	33	34	60	0.49	1.4506e-13	0
DENSCHNA	2	5	6	9	0.09	1.2e-15	0
DENSCHNB	2	3	4	5	0.06	0	0
DENSCHNC	2	9	10	13	0.15	1.8423e-13	0
DENSCHND	3	43	44	80	0.63	1.1382e-08	0
DENSCHNE	3	10	11	15	0.16	1.9841e-12	0
DENSCHNF	2	6	7	12	0.11	6.5139e-22	0
DIXMAANA	15	5	6	8	0.08	1	0
DIXMAANA	90	4	5	8	0.10	1	0
DIXMAANA	300	4	5	8	0.21	1	0
DIXMAANB	15	6	7	11	0.09	1	0
DIXMAANB	90	6	7	11	0.13	1	0
DIXMAANB	300	6	7	12	0.30	1	0
DIXMAANC	15	7	8	13	0.11	1	0
DIXMAANC	90	8	9	16	0.17	1	0
DIXMAANC	300	9	10	16	0.41	1	0
DIXMAAND	15	9	10	17	0.12	1	0
DIXMAAND	90	14	15	25	0.26	1	0

Table 212: NMTR2 with full factorization preconditioning on small problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
DIXMAAND	300	12	13	22	0.50	1	0
DIXMAANE	15	5	6	10	0.07	1	0
DIXMAANE	90	5	6	10	0.12	1	0
DIXMAANE	300	6	7	12	0.25	1	0
DIXMAANF	15	10	11	18	0.13	1	0
DIXMAANF	90	11	12	21	0.22	1	0
DIXMAANF	300	20	21	39	0.74	1	0
DIXMAANG	15	13	14	26	0.15	1	0
DIXMAANG	90	13	14	26	0.25	1	0
DIXMAANG	300	27	28	53	0.92	1	0
DIXMAANH	15	11	12	21	0.13	1	0
DIXMAANH	90	16	17	32	0.29	1	0
DIXMAANH	300	23	24	46	0.83	1	0
DIXMAANI	15	5	6	10	0.07	1	0
DIXMAANI	90	5	6	10	0.11	1	0
DIXMAANI	300	5	6	10	0.22	1	0
DIXMAANJ	15	15	16	31	0.17	1	0
DIXMAANJ	90	21	22	40	0.36	1	0
DIXMAANJ	300	37	38	75	1.19	1	0
DIXMAANK	15	12	13	23	0.14	1	0
DIXMAANK	90	17	18	35	0.30	1	0
DIXMAANK	300	46	47	92	1.52	1	0
DIXMAANL	15	15	16	28	0.18	1	0
DIXMAANL	90	60	61	119	0.93	1	0
DIXMAANL	300	90	91	180	2.82	1	0
DIXON3DQ	10	2	3	4	0.05	2.4652e-32	0
DJTL	2	127	128	175	1.79	-8951.5	0
DQDRTIC	10	2	3	2	0.06	1.6602e-23	0
DQDRTIC	100	2	3	2	0.09	1.6602e-23	0
DQDRTIC	500	2	3	2	0.22	1.6602e-23	0
DQRTIC	100	26	27	47	0.51	4.5801e-07	0
DQRTIC	500	33	34	59	1.36	5.8379e-07	0
EDENSCH	36	14	15	23	0.25	219.28	0
EIGENALS	110	21	22	41	1.00	1.4164e-12	0
EIGENALS	420	24	25	46	10.03	5.1469e-15	0
EIGENBLS	110	109	110	230	23.07	1.7954e-11	0
EIGENBLS	420	358	359	810	2943.56	7.927e-09	0
EIGENCLS	462	864	865	2178	9721.12	1.7369e-19	0
ENGVAL1	100	7	8	14	0.20	109.09	0
ENGVAL1	2	7	8	12	0.11	0	0
ERRINROS	10	41	42	73	0.61	6.6946	0
ERRINROS	50	52	53	97	0.91	39.904	0

Table 213: NMTR2 with full factorization preconditioning on small problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
EXPFIT	2	13	14	20	0.20	0.24051	0
EXTROSNB	5	34	35	67	0.49	1.0288e-12	0
FLETCBV2	100	1	2	2	0.07	-0.51401	0
FLETCBV3	100	10000	10001	18321	231.16	-5060.9	1
FLETCHBV	10	229	230	434	3.29	-2.2199e+06	0
FLETCHBV	100	10000	10001	17761	182.89	-2.5966e+11	1
FLETCHCR	10	26	27	52	0.38	2.0952e-18	0
FLETCHCR	100	144	145	288	2.97	1.1673e-17	0
FMINSURF	121	25	26	50	2.62	1	0
FMINSURF	16	13	14	24	0.22	1	0
FREUROTH	100	11	12	19	0.27	11965	0
FREUROTH	2	9	10	14	0.16	48.984	0
FREUROTH	50	11	12	19	0.22	5881	0
FREUROTH	500	11	12	19	0.68	60634	0
GENROSE	10	29	30	57	0.44	1	0
GENROSE	100	82	83	167	1.66	1	0
GENROSE	500	319	320	639	13.73	1	0
GROWTHLS	3	76	77	129	1.10	1.004	0
GULF	3	36	37	73	0.77	9.6095e-12	0
HAIRY	2	96	97	149	0.89	20	0
HATFLDD	3	10	11	20	0.16	6.6151e-08	0
HATFLDE	3	11	12	22	0.19	5.1204e-07	0
HEART6LS	6	1181	1182	1808	17.45	6.1328e-13	0
HELIX	3	11	12	22	0.18	4.6363e-18	0
HILBERTA	2	2	3	2	0.04	6.656e-31	0
HILBERTB	5	2	3	2	0.04	1.5953e-29	0
HIMMELBB	2	26	27	38	0.39	5.315e-26	0
HIMMELBF	4	810	811	1847	11.08	318.57	0
HIMMELBG	2	8	9	11	0.09	5.1108e-17	0
HIMMELBH	2	1	2	1	0.03	-1	0
HYDC20LS	99	10000	10001	75139	532.15	2.5144	1
JENSMP	2	9	10	14	0.16	124.36	0
KOWOSB	4	12	13	25	0.19	0.0003078	0
LIARWHD	100	10	11	19	0.26	1.2325e-15	0
LIARWHD	36	10	11	18	0.19	4.3062e-17	0
LIARWHD	500	14	15	21	0.97	2.4691e-12	0
LOGROS	2	42	43	58	0.59	6.1165e-11	0
MANCINO	100	12	13	19	28.78	4.5339e-21	0
MOREBV	10	2	3	4	0.05	6.582e-14	0
MOREBV	100	1	2	2	0.07	7.887e-10	0
MOREBV	500	1	2	2	0.22	5.9316e-12	0
MSQRTALS	100	102	103	203	16.28	3.1495e-10	0

Table 214: NMTR2 with full factorization preconditioning on small problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
MSQRTALS	4	15	16	28	0.22	6.2623e-12	0
MSQRTALS	49	28	29	54	1.09	1.6997e-18	0
MSQRTBLS	100	91	92	186	14.41	1.4663e-14	0
MSQRTBLS	49	23	24	45	0.86	6.1061e-12	0
MSQRTBLS	9	12	13	23	0.19	5.4066e-12	0
NCB20B	100	29	30	93	3.01	196.68	0
NCB20B	50	18	19	91	0.91	99.504	0
NCB20B	500	30	31	68	16.94	897.52	0
NONDIA	100	15	16	22	0.35	2.3207e-11	0
NONDIA	50	12	13	18	0.23	3.8512e-16	0
NONDIA	500	22	23	34	1.50	9.8906e-21	0
NONDQUAR	100	15	16	27	0.38	2.3999e-09	0
NONDQUAR	500	16	17	27	1.90	2.2043e-09	0
NONMSQRT	100	183	184	1579	11.40	18.055	3
NONMSQRT	49	219	220	704	5.12	1.0752	0
NONMSQRT	9	69	70	135	1.06	0.75181	0
OSBORNEA	5	26	27	46	0.41	5.4649e-05	0
OSBORNEB	11	20	21	38	0.56	0.040138	0
PALMER1C	8	10	11	17	0.18	0.097605	0
PALMER1D	7	8	9	15	0.15	0.65267	0
PALMER2C	8	7	8	13	0.13	0.014369	0
PALMER3C	8	7	8	13	0.13	0.019538	0
PALMER4C	8	7	8	13	0.13	0.050311	0
PENALTY1	10	21	22	28	0.34	7.0958e-05	0
PENALTY1	100	33	34	44	2.53	0.00090253	0
PENALTY1	50	31	32	43	0.86	0.00043183	0
PENALTY1	500	39	40	49	198.45	0.0047791	0
PENALTY2	10	50	51	99	0.80	0.00029386	0
PENALTY2	100	19	20	38	1.73	97096	0
PENALTY2	50	25	26	45	0.77	4.2961	0
PENALTY3	100	22	23	36	28.95	0.0010001	0
PENALTY3	50	16	17	28	3.86	0.001	0
PFIT1LS	3	76	77	122	1.09	6.4652e-13	0
POWELLSG	100	15	16	30	0.33	1.0595e-07	0
POWELLSG	500	15	16	30	0.71	5.2976e-07	0
POWELLSG	20	15	16	30	0.26	2.119e-08	0
POWELLSG	4	15	16	30	0.24	4.2381e-09	0
POWER	10	16	17	31	0.25	1.8532e-08	0
POWER	100	22	23	44	1.89	8.1386e-09	0
POWER	50	20	21	40	0.58	1.3296e-08	0
POWER	500	26	27	52	160.40	7.6219e-09	0
QUARTC	100	26	27	47	0.50	4.5801e-07	0

Table 215: NMTR2 with full factorization preconditioning on small problems (Part 4)

Problem	n	iters	evals	CGits	CPU	value	exit
QUARTC	25	21	22	39	0.34	5.2022e-08	0
QUARTC	500	33	34	59	1.36	5.8379e-07	0
ROSENBR	2	26	27	47	0.38	3.1758e-13	0
S308	2	10	11	16	0.17	0.7732	0
SCHMVETT	10	3	4	6	0.05	-24	0
SCHMVETT	500	3	4	6	0.40	-1494	0
SCHMVETT	3	3	4	6	0.05	-3	0
SCHMVETT	500	3	4	6	0.40	-1494	0
SINQUAD	100	11	12	22	0.34	1.1721e-08	0
SINQUAD	5	11	12	22	0.19	1.1721e-08	0
SINQUAD	50	11	12	22	0.25	1.1721e-08	0
SINQUAD	500	11	12	22	1.60	1.1721e-08	0
SISSER	2	12	13	19	0.18	1.1139e-08	0
SNAIL	2	74	75	133	0.69	1.0003e-11	0
SPMSRTLS	100	17	18	32	0.48	1.1669e-15	0
SPMSRTLS	28	12	13	22	0.24	7.9625e-16	0
SPMSRTLS	499	21	22	45	1.83	3.503e-14	0
SROSENBR	10	6	7	10	0.11	4.6748e-17	0
SROSENBR	100	6	7	10	0.16	4.6748e-16	0
SROSENBR	50	6	7	10	0.14	2.3374e-16	0
SROSENBR	500	10	11	20	0.52	2.9154e-13	0
TOINTGOR	50	8	9	15	0.18	1373.9	0
TOINTGSS	10	2	3	4	0.04	10	0
TOINTGSS	100	2	3	4	0.07	10	0
TOINTGSS	50	2	3	4	0.06	10	0
TOINTGSS	500	2	3	4	0.24	10	0
TOINTPSP	50	36	37	55	0.63	225.56	0
TOINTQOR	50	4	5	8	0.11	1175.5	0
TQUARTIC	100	1	2	2	0.07	3.2698e-28	0
TQUARTIC	5	1	2	2	0.04	6.4095e-31	0
TQUARTIC	50	1	2	2	0.05	2.5638e-30	0
TQUARTIC	500	1	2	2	0.25	1.5772e-27	0
TRIDIA	10	1	2	2	0.04	1.4421e-30	0
TRIDIA	100	2	3	3	0.09	4.1648e-32	0
TRIDIA	50	2	3	3	0.07	4.1648e-32	0
TRIDIA	500	2	3	3	0.27	4.0445e-33	0
VARDIM	10	14	15	14	0.23	1.595e-26	0
VARDIM	100	25	26	25	2.69	5.171e-26	0
VARDIM	50	22	23	22	0.71	1.2641e-27	0
VARDIM	500	33	34	33	300.12	1.1634e-25	0
VAREIGVL	10	18	19	39	0.28	1.4734e-08	0
VAREIGVL	100	12	13	24	1.12	3.0802e-09	0

Table 216: NMTR2 with full factorization preconditioning on small problems (Part 5)

Problem	n	iters	evals	CGits	CPU	value	exit
VAREIGVL	50	13	14	26	0.42	1.227e-10	0
VAREIGVL	500	12	13	23	73.93	1.8652e-08	0
VIBRBEAM	8	112	113	206	2.35	1.7804	0
WATSON	12	31	32	65	0.75	1.7256e-08	0
WATSON	31	11	12	24	0.61	1.538e-09	0
WOODS	100	15	16	28	0.33	2.0135e-17	0
WOODS	4	15	16	28	0.23	8.0539e-19	0
WOODS	500	16	17	31	0.81	9.8289e-15	0
YFITU	3	46	47	89	0.70	6.6697e-13	0
ZANGWIL2	2	1	2	1	0.03	-18.2	0
PFIT2LS	3	127	128	204	1.80	8.6809e-12	0
PFIT3LS	3	63	64	102	0.91	7.1038e-14	0
PFIT4LS	3	50	51	69	0.72	7.3996e-14	0
EXTROSNB	10	75	76	149	1.11	1.1572e-07	0
EXTROSNB	50	78	79	155	1.40	6.0631e-07	0
EXTROSNB	100	70	71	139	1.33	8.7683e-07	0

Table 217: NMTR2 with full factorization preconditioning on small problems (Part 6)

Problem	n	iters	evals	CGits	CPU	value	exit
ARWHEAD	1000	5	6	6	1.57	1.6903e-10	0
ARWHEAD	5000	5	6	6	26.75	1.11e-12	0
BDQRTIC	1000	11	12	20	8.21	3983.8	0
BROYDN7D	1000	32	33	64	4.25	298.15	0
BRYBND	1000	11	12	23	2.67	4.18e-10	0
BRYBND	5000	12	13	23	14.26	8.532e-15	0
CRAGGLVY	1000	14	15	25	1.71	336.42	0
CRAGGLVY	5000	14	15	26	8.69	1688.2	0
DIXMAANA	1500	4	5	8	0.80	1	0
DIXMAANA	3000	4	5	8	1.59	1	0
DIXMAANB	1500	6	7	12	1.23	1	0
DIXMAANB	3000	6	7	12	2.43	1	0
DIXMAANC	1500	9	10	17	1.76	1	0
DIXMAANC	3000	9	10	17	3.58	1	0
DIXMAAND	1500	13	14	26	2.02	1	0
DIXMAAND	3000	15	16	28	4.71	1	0
DIXMAANE	1500	6	7	12	0.98	1	0
DIXMAANE	3000	6	7	12	1.94	1	0
DIXMAANF	1500	24	25	51	3.28	1	0
DIXMAANF	3000	35	36	72	9.70	1	0
DIXMAANG	1500	48	49	94	6.16	1	0
DIXMAANG	3000	48	49	97	12.83	1	0
DIXMAANH	1500	29	30	60	3.98	1	0
DIXMAANH	3000	64	65	127	16.04	1	0
DIXMAANI	1500	5	6	10	0.89	1	0
DIXMAANI	3000	6	7	12	1.96	1	0
DIXMAANJ	1500	60	61	125	7.90	1	0
DIXMAANJ	3000	43	44	86	11.33	1	0
DIXMAANK	1500	78	79	162	9.94	1	0
DIXMAANK	3000	84	85	173	21.11	1	0
DIXMAANL	1500	36	37	74	4.93	1	0
DIXMAANL	3000	94	95	192	23.99	1	0
DQDRTIC	1000	2	3	2	0.39	1.6602e-23	0
DQDRTIC	5000	2	3	2	1.83	1.6602e-23	0
DQRTIC	1000	35	36	62	2.45	3.6952e-06	0
DQRTIC	5000	42	43	73	13.37	7.0042e-06	0
EDENSCH	2000	14	15	22	3.03	12003	0
EIGENALS	930	97	98	183	176.50	7.653e-14	0
EIGENBLS	930	—	—	—	—	—	6
ENGVAL1	1000	7	8	14	0.94	1108.2	0
ENGVAL1	5000	7	8	14	4.42	5548.7	0
FLETCBV2	1000	0	1	0	0.34	-0.50134	0

Table 218: NMTR2 with full factorization preconditioning on large problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
FLETCBV3	1000	10000	10001	12174	1110.62	-1.8877e+06	1
FMINSURF	1024	59	60	118	3233.87	1	0
FMINSURF	5625	1	2	1	33.25	28.594	5
FREUROTH	1000	11	12	19	1.28	121470	0
FREUROTH	5000	11	12	19	6.10	608160	0
LIARWHD	1000	13	14	20	2.17	2.9481e-18	0
LIARWHD	5000	13	14	18	29.10	6.0958e-16	0
MOREBV	1000	1	2	2	0.43	7.3289e-13	0
MOREBV	5000	1	2	2	2.00	5.8271e-15	0
MSQRTALS	1024	—	—	—	—	—	6
MSQRTALS	529	262	263	538	4733.81	2.3561e-11	0
MSQRTBLS	529	252	253	531	4553.70	1.2116e-11	0
MSQRTBLS	1024	—	—	—	—	—	6
NCB20B	1000	35	36	86	38.91	1676	0
NONDIA	1000	27	28	43	4.30	5.542e-17	0
NONDIA	5000	41	42	63	100.70	2.3392e-15	0
NONDIA	10000	41	42	63	368.94	1.2261e-07	0
NONDQUAR	1000	17	18	29	6.18	9.7143e-10	0
NONDQUAR	5000	18	19	29	135.86	1.0132e-09	0
NONDQUAR	10000	19	20	30	615.01	3.8883e-10	0
NONMSQRT	529	—	—	—	—	—	6
PENALTY1	1000	45	46	58	1893.40	0.0096862	0
POWELLSG	1000	15	16	30	1.22	1.0595e-06	0
POWELLSG	5000	15	16	30	5.55	5.2976e-06	0
POWELLSG	10000	15	16	30	11.25	1.0595e-05	0
POWER	1000	28	29	56	1434.34	4.7488e-09	0
QUARTC	1000	35	36	62	2.48	3.6952e-06	0
QUARTC	5000	42	43	73	13.44	7.0042e-06	0
QUARTC	10000	45	46	78	28.28	8.7486e-06	0
SCHMVETT	1000	3	4	6	0.83	-2994	0
SCHMVETT	5000	3	4	6	3.84	-14994	0
SCHMVETT	10000	3	4	6	7.71	-29994	0
SINQUAD	1000	11	12	22	4.80	1.1721e-08	0
SINQUAD	5000	13	14	26	110.86	3.5185e-10	0
SINQUAD	10000	19	20	36	645.67	1.4179e-10	0
SPMSRTLS	1000	19	20	38	3.17	1.2065e-11	0
SPMSRTLS	4999	31	32	64	24.09	5.9398e-12	0
SPMSRTLS	10000	44	45	99	68.96	4.635e-15	0
SROSENBR	1000	10	11	20	0.89	5.8309e-13	0
SROSENBR	5000	10	11	20	4.03	2.9154e-12	0
SROSENBR	10000	10	11	20	8.16	5.8309e-12	0
TESTQUAD	1000	2	3	3	0.44	2.3752e-30	0

Table 219: NMTR2 with full factorization preconditioning on large problems (Part 2)

Problem	n	iters	evals	CGits	CPU	value	exit
TOINTGSS	1000	2	3	4	0.48	10	0
TOINTGSS	5000	2	3	4	2.23	10	0
TOINTGSS	10000	2	3	4	4.44	10	0
TQUARTIC	1000	1	2	2	0.55	1.7736e-27	0
TQUARTIC	5000	1	2	2	6.12	1.9964e-26	0
TQUARTIC	10000	1	2	2	27.84	1.6149e-25	0
TRIDIA	1000	2	3	3	0.52	1.1556e-33	0
TRIDIA	5000	2	3	3	2.34	4.1889e-33	0
TRIDIA	10000	2	3	3	4.69	1.5407e-32	0
VARDIM	1000	36	37	36	2588.16	1.1203e-20	0
VARDIM	5000	1	2	1	122.88	4.8283e+27	5
VAREIGVL	1000	12	13	24	604.56	5.6909e-08	0
VAREIGVL	5000	1	2	1	38.10	236900	5
WOODS	1000	16	17	31	1.43	1.9658e-14	0
WOODS	10000	16	17	31	13.51	1.9658e-13	0
FLETCHCR	1000	1321	1322	2642	100.59	1.3653e-20	0
GENROSE	1000	802	803	1606	61.44	1	0

Table 220: NMTR2 with full factorization preconditioning on large problems (Part 3)

Problem	n	iters	evals	CGits	CPU	value	exit
BRITGAS	450	109	110	2682	26.67	0	0
CATENARY	501	366	367	16328	76.32	-348400	0
CHANDHEQ	100	13	14	26	34.36	1.5489e-08	0
CHEMRCTA	100	6063	6064	12386	158.09	0.0060578	8
CHEMRCTB	1000	66	67	138	8.89	3.6988e-20	0
CLPLATEC	5041	1	2	2	2.62	-0.0050207	0
CORKSCRW	456	77	78	3734	20.37	26.484	0
DALLASM	196	42	43	85	1.88	-48198	0
DISCS	36	139	140	723	4.92	21.376	0
DRUGDIS	304	246	247	8508	43.56	4.2428	0
DTOC5	9999	21	22	42	46.47	1.5316	0
EXPFITB	5	29	30	80	1.12	0.0050194	0
EXPFITC	5	43	44	222	6.41	0.023302	0
FCCU	19	10	11	20	0.24	11.149	0
FLETCHER	4	29	30	57	0.49	19.525	0
GILBERT	500	27	28	38	154.55	237.37	0
GRIDNETA	3444	18	19	43	10.61	161.61	0
GRIDNETE	3444	11	12	22	15.73	144.06	0
HADAMARD	257	253	254	2427	357.18	1	0
HAGER3	2001	4	5	8	3.53	0.14096	0
HAGER4	2001	8	9	1014	23.90	2.7942	0
HS114	10	197	198	432	3.21	-1768.8	0
HS59	2	199	200	343	3.10	-6.7495	0
HS75	4	98	99	234	1.57	5174.4	0
HVYCRASH	204	759	760	3230	29.39	-0.2185	0
HYDROELL	1009	140	141	6996	81.61	-3.5855e+06	0
JUNKTURN	5010	176	177	8635	648.87	1.4212e-05	0
KSIP	20	28	29	247	30.30	0.57579	0
LINVERSE	1999	69	70	1078	57.43	681	0
LMINSURF	1024	36	37	72	7.55	9	0
MANNE	300	8	9	128	1.39	-0.97457	0
MEYER3	3	108	109	228	1.62	87.946	0
MINPERM	51	29	30	71	0.89	0.0384	0
MISTAKE	9	32	33	79	0.57	-1	0
NGONE	50	435	436	3790	50.89	-0.64206	0
NLMSURF	1024	21	22	42	4.57	38.591	0
NYSTROM5	18	38	39	85	0.66	4.1681e-13	0
ODC	10404	19	20	38	55.31	-0.0040122	0
OET1	3	28	29	322	10.51	0.53824	0
OPTCTRL3	122	46	47	91	1.52	2048	0
ORTHREGA	2053	110	111	270	82.73	5661.4	0
ORTHREGC	5005	61	62	458	217.89	94.813	0

Table 221: NMTR2 with full factorization preconditioning on constrained problems (Part 1)

Problem	n	iters	evals	CGits	CPU	value	exit
ORTHREGD	103	59	60	112	1.76	15.59	0
ORTHREGF	1205	60	61	135	16.43	17.029	0
PRODPL1	60	48	49	587	1.29	35.739	0
QR3D	610	392	393	1036	2964.83	0.0084382	8
QR3DBD	457	118	119	234	457.39	1.5033e-13	0
READING1	202	549	550	11224	37.73	-0.16049	0
SEMICON1	102	396	397	777	14.54	9.0932e-16	0
SEMICON2	1002	134	135	261	32.81	1.6734e-06	0
SIPOW1	2	28	29	375	27.82	-1	0
SPANHYD	97	40	41	563	1.48	239.74	0
SSC	10404	1	2	2	7.21	-2.0782	0
SSEBNLN	194	65	66	1304	3.28	1.6171e+07	0
SSNLBEAM	3003	927	928	16372	826.25	340.03	0
STEENBRE	540	87	88	2001	10.60	27459	0
TENBARS1	18	1620	1621	4299	28.12	2295.4	0
TENBARS2	18	1058	1059	2766	17.50	2277.9	0
TRAINF	408	47	48	1154	5.78	3.0975	0
TRUSPYR1	11	1100	1101	3088	17.85	11.229	0
UBH5	1010	24	25	45	5.19	1.1163	0
WATER	31	29	30	137	0.61	10549	0
ZIGZAG	304	75	76	2501	9.44	33.787	0

Table 222: NMTR2 with full factorization preconditioning on constrained problems (Part 2)

References

[Toint, 1994] Ph. L. Toint. A non-monotone trust-region algorithm for nonlinear optimization subject to convex constraints. Technical Report 94/24, Department of Mathematics, FUNDP, Namur, Belgium, 1994.