

Test results for selected optimization problems

1 Performance plots

1.1 For all problems

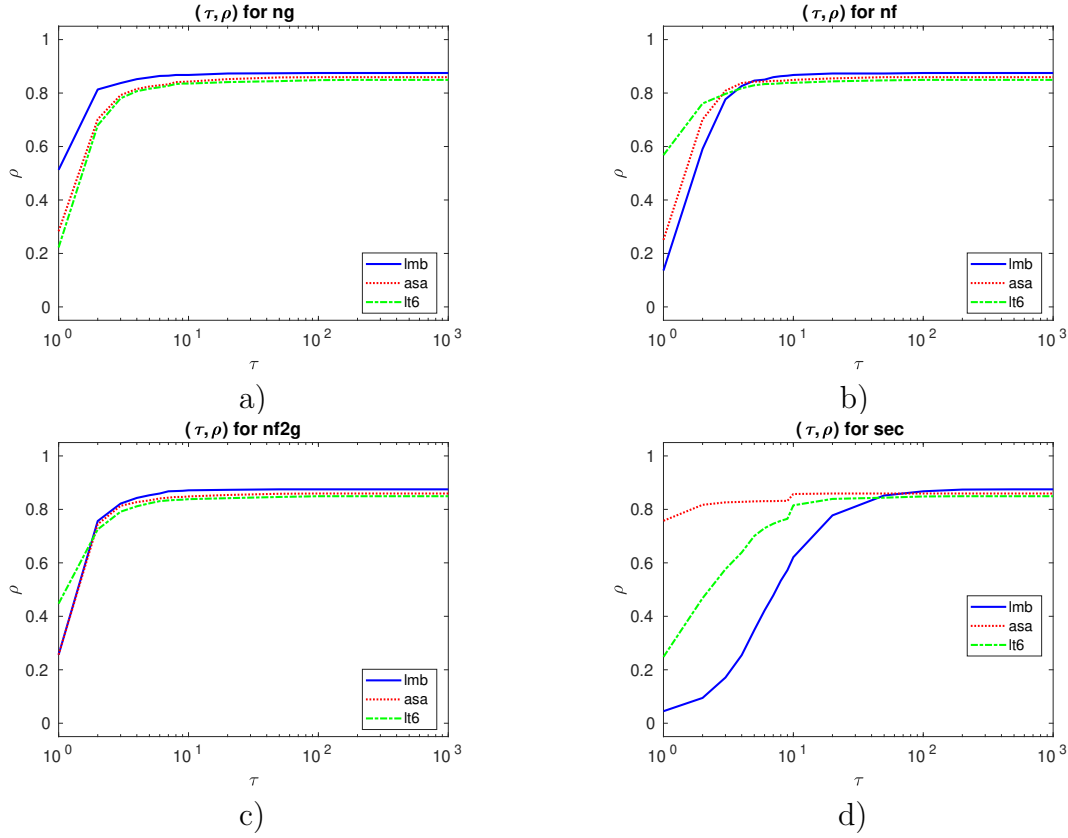


Figure 1: (a)-(e): Performance plots for $\text{ng}/(\text{best ng})$, $\text{nf}/(\text{best nf})$, $\text{nf2g}/(\text{best nf2g})$ and $\text{msec}/(\text{best msec})$, respectively. ρ designates the percentage of problems solved within a factor τ of the best solver. Problem solved by no solver are ignored.

1.2 For unconstrained problems

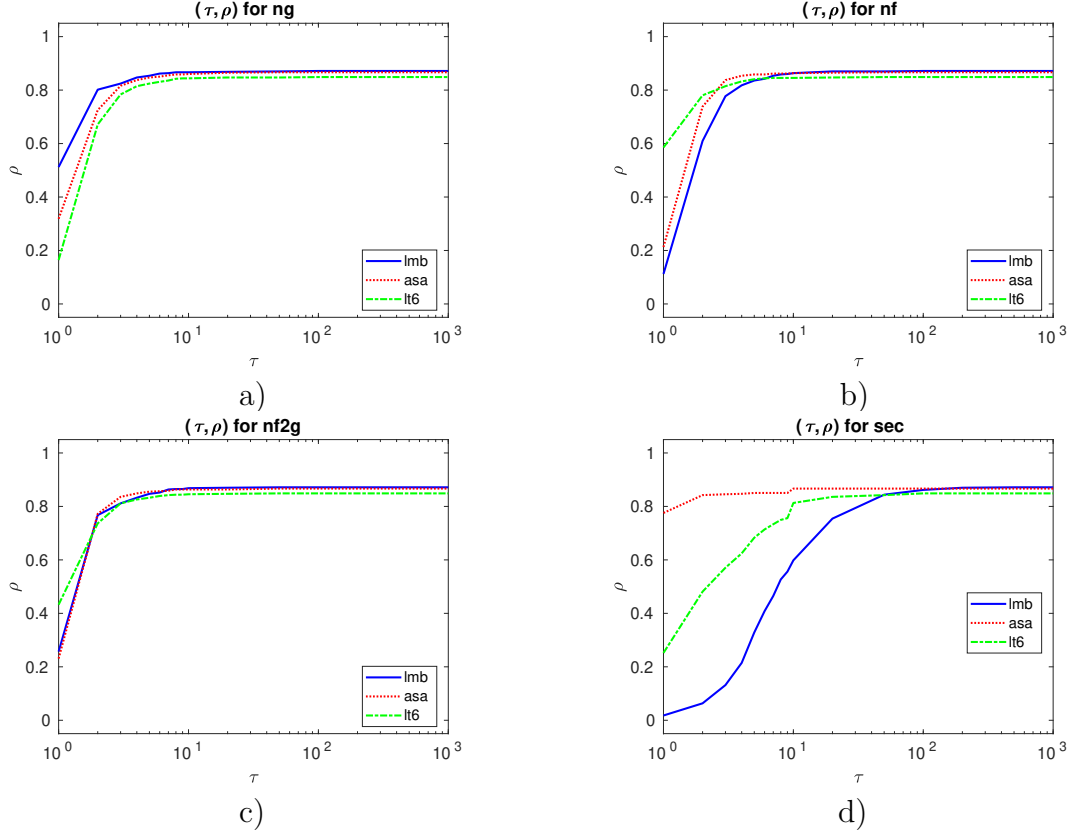


Figure 2: (a)-(e): Performance plots for ng/(best ng), nf/(best nf), nf2g/(best nf2g) and msec/(best msec), respectively. ρ designates the percentage of problems solved within a factor τ of the best solver. Problem solved by no solver are ignored.

1.3 For bound constrained problems

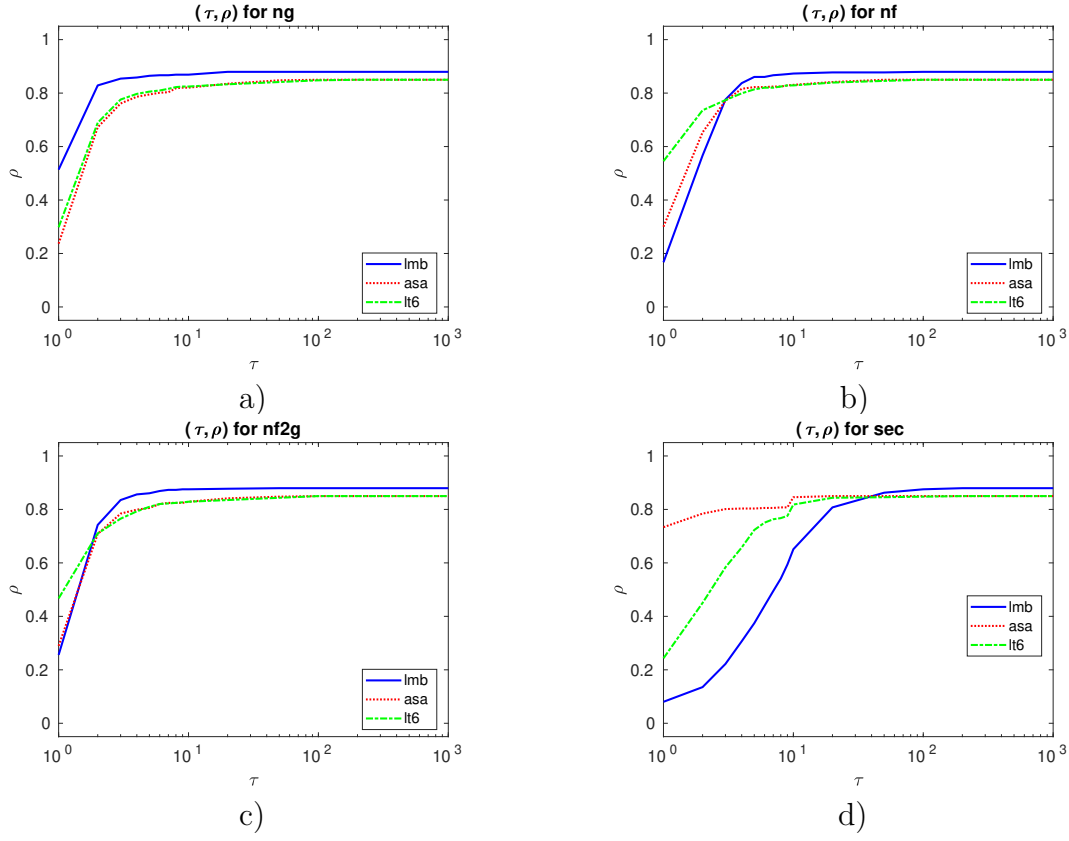


Figure 3: (a)-(e): Performance plots for $\text{ng}/(\text{best ng})$, $\text{nf}/(\text{best nf})$, $\text{nf2g}/(\text{best nf2g})$ and $\text{msec}/(\text{best msec})$, respectively. ρ designates the percentage of problems solved within a factor τ of the best solver. Problem solved by no solver are ignored.

2 Choices

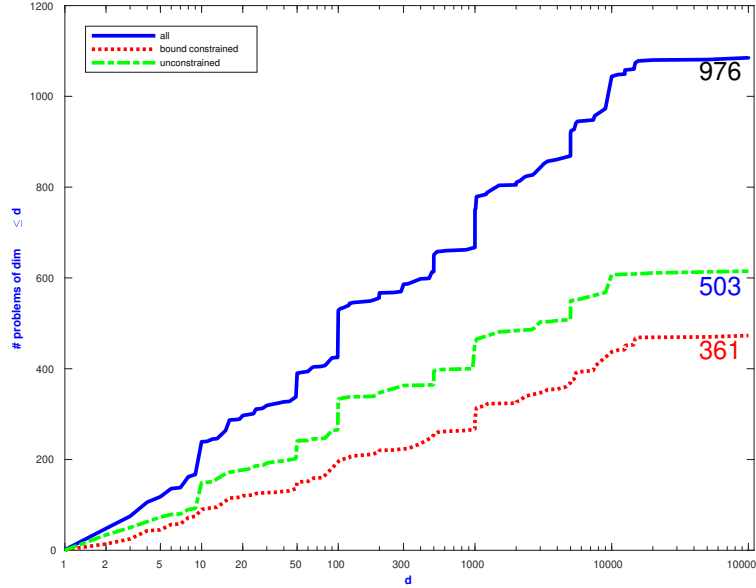


Figure 4: The number of problems with at most d variables solved by at least one solver.

2.1 Solvers compared

LMBOPT, ASACG and LMBFG-EIG-MS

2.2 Solver type, stopping tests and resdir

`nf`, `ng`, `sec`, `nact` and `resdir` denote the number of function evaluations, the number of gradients evaluations, the time in seconds, the number of active variables, and directory containing result files, respectively.

- `fist-order`
- `gradient accuracy`: $\|g(x_*)\|_\infty \leq 1e-06$
- `nf2g` $\leq 20 * n + 10000$
- `sec` ≤ 300
- `resdir`: `resG1` – `6resN` – `20 * n + 10000` – `resS300N`

2.3 Parameters used for problem selection

`name`, `dim` and `con` denote the name, the dimension, and the type of constraints of test problems, respectively.

- Selected range of `name`: A-Z
- Selected range of `dim`: [1,100001]
- Selected kind of `con`: unconstrained and bound constrained
- Sorted by `dim`, `name` and `nact` (DNE)
- Sorted in increasing order

3 Summarizing tables

For a given collection S of solvers, the strength of a solver $so \in S$ – relative to an ideal solver that matches on each problem the best solver – is measured, for any given cost measure c_s by the number, q_{so} defined by

$$q_{so} := \begin{cases} \frac{\min_{s \in S} c_s}{c_{so}}, & \text{if } so \text{ solved the problem,} \\ 0, & \text{otherwise,} \end{cases}$$

called the **efficiency** of the solver so with respect to this cost measure. In the tables, efficiencies are given in percent. Larger efficiencies in the table imply a better average behavior; a zero efficiency indicates failure. All values are rounded (towards zero) to integers. Mean efficiencies are taken over the 976 problems tried by all solvers and solved by at least one of them, from a total of 1088 problems. In the following tables, of test problems in which the solver needed the least number **nf2g** and !100 the total number of test problems where the solver was the only one needing this many **nf2g**. T_{mean} is defined by

$$T_{mean} := \frac{\sum \text{ solved}}{\# \text{ solved}} \quad (\text{in msec}),$$

regardless of the time for unsolved problems.

In tables not recording efficiencies, a sign

- n indicates that **nf2g** ≥ 2010020 was reached.
- t indicates that **sec** ≥ 300 was reached.
- f indicates that the **algorithm** failed for other reasons.

In times, the (for some problems significant) setup time for CUTEST is not included. Although running times are reported the comparison of times is not very reliable for several reasons:

- (i) The times were obtained under different conditions (solver source code Fortran, C and Matlab).
- (ii) In unsuccessful runs, the actual running time depends a lot on when and why the solver was stopped.
- (iii) Function and gradient evaluation includes times for computing various statistics and the interface to CUTEST; cf. Figure 5.

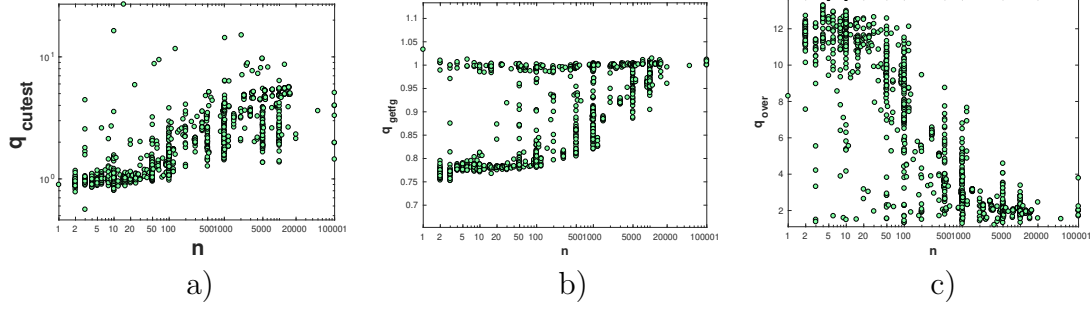


Figure 5: Comparison of $q_{cutest} := \frac{t_g(cutest)}{t_f(cutest)}$, $q_{getfg} := \frac{t_g(getfg)}{t_f(getfg)}$ and $q_{over} := \frac{t_{f2g}(getfg)}{t_{f2g}(cutest)}$ versus dimensions, respectively, where t_f and t_g are considered the time to compute f and g by cutest or getfg and $t_{f2g} := t_f + 2t_g$.

stopping test: $\ g\ _\infty \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$													
976 of 1088 problems solved									mean efficiency in %				
dim $\in[1,100001]$						# of anomalies			for cost measure				
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec	
LMBOPT	lmb	952	280	246	4310	87	49	0	68	76	53	19	
ASACG	asa	935	281	233	1416	98	21	34	66	65	62	80	
LMBFG-EIG-MS	lt6	924	487	447	2970	119	26	19	69	62	73	47	

3.1 Classified by constraints

stopping test: $\ g\ _\infty \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$													
552 of 615 problems without bounds solved									mean efficiency in %				
dim $\in[1,100001]$						# of anomalies			for cost measure				
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec	
LMBOPT	lmb	536	158	156	4251	47	32	0	68	75	53	17	
ASACG	asa	533	142	129	1331	53	16	13	68	67	62	82	
LMBFG-EIG-MS	lt6	522	266	253	3055	68	21	4	70	60	74	47	

stopping test: $\ g\ _\infty \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$													
424 of 473 problems with bounds solved									mean efficiency in %				
dim $\in[1,100001]$						# of anomalies			for cost measure				
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec	
LMBOPT	lmb	416	122	90	4387	40	17	0	67	76	53	23	
ASACG	asa	402	139	104	1530	45	5	21	64	60	62	78	
LMBFG-EIG-MS	lt6	402	221	194	2859	51	5	15	69	63	71	48	

3.2 Classified by time

stopping test: $\ g\ _\infty \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$													
812 of 812 problems solved									mean efficiency in %				
dim $\in[1,100001]$, best time ≤ 1 sec						# of anomalies			for cost measure				
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec	
LMBOPT	lmb	802	231	198	674	7	3	0	76	85	60	19	
ASACG	asa	790	267	220	100	16	0	6	77	76	72	91	
LMBFG-EIG-MS	lt6	774	385	345	293	34	1	3	76	69	80	51	

stopping test: $\ g\ _\infty \leq 1e-06,$ $sec \leq 300,$ $nf2g \leq 20 * n + 10000$												
136 of 136 problems solved									mean efficiency in %			
dim $\in[1,100001]$, best time > 1 sec						# of anomalies			for cost measure			
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec
LMBOPT	lmb	132	37	36	11698	3	1	0	77	88	56	36
LMBFG-EIG-MS	lt6	127	90	90	5549	7	1	1	85	74	88	63
ASACG	asa	126	10	9	3966	7	0	3	59	57	55	86

3.3 Classified by dimension

stopping test: $\ g\ _\infty \leq 1e-06,$ $sec \leq 300,$ $nf2g \leq 20 * n + 10000$												
47 of 48 problems solved									mean efficiency in %			
dim $\in[1,2]$						# of anomalies			for cost measure			
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec
LMBOPT	lmb	47	7	3	106	1	0	0	73	86	54	20
ASACG	asa	46	17	13	20	1	0	1	78	79	69	92
LMBFG-EIG-MS	lt6	45	30	27	41	3	0	0	84	74	87	62

stopping test: $\ g\ _\infty \leq 1e-06,$ $sec \leq 300,$ $nf2g \leq 20 * n + 10000$												
69 of 70 problems solved									mean efficiency in %			
dim $\in[3,5]$						# of anomalies			for cost measure			
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec
LMBOPT	lmb	69	21	19	121	1	0	0	78	87	64	26
ASACG	asa	64	27	22	24	5	0	1	73	72	66	84
LMBFG-EIG-MS	lt6	61	28	23	27	9	0	0	69	60	75	56

stopping test: $\ g\ _\infty \leq 1e-06,$ $sec \leq 300,$ $nf2g \leq 20 * n + 10000$												
113 of 121 problems solved									mean efficiency in %			
dim $\in[6,10]$						# of anomalies			for cost measure			
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec
LMBOPT	lmb	113	47	41	218	8	0	0	71	76	62	27
ASACG	asa	107	43	36	30	6	0	8	69	67	67	81
LMBFG-EIG-MS	lt6	94	34	29	104	26	0	1	53	49	57	48

stopping test: $\ g\ _\infty \leq 1e-06,$ $sec \leq 300,$ $nf2g \leq 20 * n + 10000$												
55 of 58 problems solved									mean efficiency in %			
dim $\in[11,20]$						# of anomalies			for cost measure			
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec
LMBFG-EIG-MS	lt6	55	17	12	637	3	0	0	69	58	74	64
	lmb	54	22	15	174	4	0	0	77	83	60	16
	asa	53	27	17	10	3	0	2	78	73	72	78

stopping test: $\ g\ _\infty \leq 1e-06,$ $sec \leq 300,$ $nf2g \leq 20 * n + 10000$												
88 of 93 problems solved									mean efficiency in %			
dim $\in[21,50]$						# of anomalies			for cost measure			
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec
LMBOPT	lmb	87	31	30	313	6	0	0	72	82	58	22
LMBFG-EIG-MS	lt6	84	42	41	108	8	0	1	70	65	74	62
ASACG	asa	77	17	16	49	12	0	4	61	61	56	76

stopping test: $\ g\ _{\infty} \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$												
125 of 138 problems solved									mean efficiency in %			
dim \in [51,100]						# of anomalies			for cost measure			
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec
LMBOPT	lmb	124	41	39	382	14	0	0	71	79	55	18
ASACG	asa	122	37	33	124	12	0	4	68	68	63	81
LMBFG-EIG-MS	lt6	119	53	49	135	18	0	1	70	63	74	54

stopping test: $\ g\ _{\infty} \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$												
31 of 39 problems solved									mean efficiency in %			
dim \in [101,200]						# of anomalies			for cost measure			
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec
LMBOPT	lmb	30	9	8	1246	9	0	0	60	66	48	19
ASACG	asa	30	14	13	422	6	0	3	63	60	60	71
LMBFG-EIG-MS	lt6	30	10	9	232	6	0	3	57	51	59	46

stopping test: $\ g\ _{\infty} \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$												
19 of 19 problems solved									mean efficiency in %			
dim \in [201,300]						# of anomalies			for cost measure			
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec
LMBOPT	lmb	19	4	4	402	0	0	0	86	96	60	16
ASACG	asa	19	5	4	90	0	0	0	84	86	71	81
LMBFG-EIG-MS	lt6	19	11	10	156	0	0	0	93	79	95	70

stopping test: $\ g\ _{\infty} \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$												
12 of 12 problems solved									mean efficiency in %			
dim \in [301,400]						# of anomalies			for cost measure			
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec
LMBOPT	lmb	12	3	3	230	0	0	0	60	72	45	15
ASACG	asa	12	5	5	37	0	0	0	78	71	92	92
LMBFG-EIG-MS	lt6	12	4	4	121	0	0	0	64	60	63	43

stopping test: $\ g\ _{\infty} \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$												
48 of 52 problems solved									mean efficiency in %			
dim \in [401,500]						# of anomalies			for cost measure			
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec
ASACG	asa	48	13	11	122	3	0	1	74	72	69	90
LMBOPT	lmb	47	12	11	540	5	0	0	70	81	52	14
LMBFG-EIG-MS	lt6	47	26	24	511	3	0	2	79	71	84	26

stopping test: $\ g\ _{\infty} \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$												
81 of 99 problems solved									mean efficiency in %			
dim \in [501,1000]						# of anomalies			for cost measure			
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec
LMBFG-EIG-MS	lt6	78	39	37	2696	18	0	3	63	58	66	22
ASACG	asa	76	22	20	629	21	0	2	61	59	59	74
LMBOPT	lmb	74	24	22	4120	25	0	0	57	64	44	9

stopping test: $\ g\ _{\infty} \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$													
49 of 60 problems solved									mean efficiency in %				
dim $\in[1001,2000]$						# of anomalies			for cost measure				
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec	
LMBFG-EIG-MS	lt6	49	37	35	1586	10	0	1	72	65	74	26	
LMBOPT	lmb	48	9	8	2463	12	0	0	58	68	43	10	
ASACG	asa	47	5	4	330	11	0	2	54	56	48	77	

stopping test: $\ g\ _{\infty} \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$													
30 of 34 problems solved									mean efficiency in %				
dim $\in[2001,3000]$						# of anomalies			for cost measure				
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec	
LMBFG-EIG-MS	lt6	30	26	25	12012	3	0	1	87	78	88	28	
ASACG	asa	29	3	2	3268	4	0	1	62	62	55	85	
LMBOPT	lmb	28	2	2	6432	2	4	0	61	72	42	7	

stopping test: $\ g\ _{\infty} \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$													
16 of 18 problems solved									mean efficiency in %				
dim $\in[3001,4000]$						# of anomalies			for cost measure				
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec	
LMBOPT	lmb	16	3	3	3381	0	2	0	64	78	47	17	
ASACG	asa	16	1	1	639	0	1	1	60	56	66	88	
LMBFG-EIG-MS	lt6	16	12	12	1689	0	0	2	78	72	82	38	

stopping test: $\ g\ _{\infty} \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$													
44 of 57 problems solved									mean efficiency in %				
dim $\in[4001,5000]$						# of anomalies			for cost measure				
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec	
LMBOPT	lmb	42	15	13	24462	0	15	0	55	62	44	18	
ASACG	asa	42	15	12	5044	12	2	1	57	55	58	69	
LMBFG-EIG-MS	lt6	40	19	16	11224	10	6	1	54	49	58	32	

stopping test: $\ g\ _{\infty} \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$													
112 of 126 problems solved									mean efficiency in %				
dim $\in[5001,10000]$						# of anomalies			for cost measure				
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec	
ASACG	asa	110	23	19	4803	2	12	2	63	62	58	84	
LMBFG-EIG-MS	lt6	109	73	70	9258	2	13	2	77	69	81	58	
LMBOPT	lmb	108	22	19	16259	0	18	0	66	76	49	25	

stopping test: $\ g\ _{\infty} \leq 1e-06$, $sec \leq 300$, $nf2g \leq 20 * n + 10000$													
37 of 44 problems solved									mean efficiency in %				
dim $\in[10001,100001]$						# of anomalies			for cost measure				
solver		solved	#100	!100	T_{mean}	#n	#t	#f	nf2g	ng	nf	msec	
ASACG	asa	37	7	5	9999	0	6	1	60	56	55	76	
LMBFG-EIG-MS	lt6	36	26	24	13932	0	7	1	73	62	76	60	
LMBOPT	lmb	34	8	6	13748	0	10	0	68	75	49	32	

3.4 Failure analysis

112 test problems unsolved by all solvers used for $\dim \in [1, 100001]$			
BROWNB	OSCIPATH:5	PALMER5E	PALMER5B
OSCIGRAD:10	OSCIPATH:10	STRATEC	SBRYBND:10
SCOSINE:10	SCURLY10:10	SCOND1LS	OSCIGRAD:15
SINEALI:20	OSCIGRAD:25	ANTWERP	NONMSQRT:49
HS110:50	SBRYBND:50	SCOND1LS:52	RAYBENDS
RAYBENDL:66	RAYBENDS:66	HYDC20LS	FLETCHBV:100
HS110:100	NONMSQRT:100	OSCIGRAD:100	SBRYBND:100
SCOSINE:100	SCURLY10:100	SSCOSINE:100	SCOND1LS:102
RAYBENDL:130	RAYBENDS:130	QR3DLS	GRIDGENA:170
DRCV1LQ	LINVERSE:199	HS110:200	SPMSRTLS:499
PENALTY2:500	SBRYBND:500	SSBRYBND:500	SCOND1LS:502
MSQRTALS:529	MSQRTBLS:529	NONMSQRT:529	GRIDGENA
QR3DLS:610	LINVERSE:999	COSINE	CURLY20
CURLY30	CHENHARK	FLETCHBV:1000	PENALTY2:1000
SBRYBND	SCOSINE	SCURLY10	SSCOSINE
SPMSRTLS:1000	SCOND1LS:1002	MSQRTALS:1024	MSQRTBLS:1024
NONMSQRT:1024	RAYBENDL:1026	RAYBENDS:1026	DRCV1LQ:1225
DRCV2LQ:1225	DRCV3LQ:1225	GRIDGENA:1226	LINVERSE:1999
RAYBENDL:2050	RAYBENDS:2050	GRIDGENA:2114	EIGENALS:2550
GRIDGENA:3242	JIMACK	DRCV1LQ:4489	DRCV2LQ:4489
DRCV3LQ:4489	GRIDGENA:4610	MSQRTALS:4900	MSQRTBLS:4900
SPMSRTLS:4999	FLETCHBV3:5000	FLETCHBV:5000	SBRYBND:5000
SCOSINE:5000	SPARSINE:5000	SSCOSINE:5000	SCOND1LS:5002
BRATU1D:5003	GRIDGENA:6218	COSINE:10000	CURLY10:10000
CURLY20:10000	CURLY30:10000	FLETCHBV3:10000	FLETCHBV:10000
SCOSINE:10000	SCURLY10:10000	SPARSINE:10000	SPMSRTLS:10000
SSCOSINE:10000	DRCV1LQ:10816	DRCV2LQ:10816	DRCV3LQ:10816
ODNAMUR	GRIDGENA:12482	SSCOSINE:100000	DEGTRID:100001

solver	$\dim \in [1, 100001]$	problem	error message	# same error
lmb	2	BROWNB	nf2gmax reached	87
	2050	RAYBENDS	secmax reached	49
Continued on next page				

asa	2	BROWNBS	cg: too many secant iterates	30
	2	MDHOLE	unrecognized exit flag	255
	2	OSCIGRAD	nf2gmax reached	98
	5	OSBORNEA	cg: function nan or inf	1
	100	SCOSINE	cg: Wolfe conditions never satisfied	1
	500	PENALTY2	cg: slope negative in line search	1
	3549	JIMACK	secmax reached	21
lt6	2	BROWNBS	nf2gmax reached	119
	10	HS110	line search failed	4
	10	NCVXBQP3	unknown	9
	170	GRIDGENA	TR radius too small	15
	4900	MSQRTALS	secmax reached	26

kind of anomalies	112 test problems unsolved by LMBOPT for $\dim \in [1,100001]$		
n	BROWNBS	OSCIPATH:5	PALMER5E
	PALMER5B	OSCIGRAD:10	OSCIPATH:10
	STRATEC	SBRYBND:10	SCOSINE:10
	SCURLY10:10	OSBORNEB	SCOND1LS
	OSCIGRAD:15	SINEALI:20	OSCIGRAD:25
	ANTWERP	RAYBENDL	NONMSQRT:49
	HS110:50	SBRYBND:50	SCOND1LS:52
	RAYBENDS	RAYBENDL:66	RAYBENDS:66
	HYDC20LS	FLETCHBV:100	HS110:100
	NONMSQRT:100	OSCIGRAD:100	SBRYBND:100
	SCOSINE:100	SCURLY10:100	SPMSRTLS:100
	SSCOSINE:100	SCOND1LS:102	RAYBENDL:130
	RAYBENDS:130	QR3DLS	GRIDGENA:170
	DRCV1LQ	LINVERSE:199	HS110:200
	PENALTY2:200	SPMSRTLS:499	BDEXP:500
	PENALTY2:500	SBRYBND:500	SSBRYBND:500
	SCOND1LS:502	BRATU1D:503	MSQRTALS:529
	MSQRTBLS:529	NONMSQRT:529	GRIDGENA
	Continued on next page		

	QR3DLS:610	LINVERSE:999	BDEXP:1000
	COSINE	CURLY10	CURLY20
	CURLY30	CHENHARK	FLETCHBV3:1000
	FLETCHBV:1000	INDEFM	OSCIGRAD:1000
	PENALTY2:1000	POWELLBC:1000	SBRYBND
	SCOSINE	SCURLY10	SSCOSINE
	SPMSRTLS:1000	SCOND1LS:1002	BRATU1D:1003
	MSQRTALS:1024	MSQRTBLS:1024	NONMSQRT:1024
	RAYBENDL:1026	RAYBENDS:1026	DRCV1LQ:1225
	DRCV2LQ:1225	DRCV3LQ:1225	GRIDGENA:1226
	LINVERSE:1999	RAYBENDL:2050	GRIDGENA:2114
t	RAYBENDS:2050	EIGENALS:2550	EIGENBLS:2550
	EIGENCLS:2652	GRIDGENA:3242	JIMACK
	DRCV1LQ:4489	DRCV2LQ:4489	DRCV3LQ:4489
	GRIDGENA:4610	MSQRTALS:4900	MSQRTBLS:4900
	SPMSRTLS:4999	FLETBV3M:5000	FLETCHBV3:5000
	FLETCHBV:5000	INDEFM:5000	SBRYBND:5000
	SCOSINE:5000	SPARSINE:5000	SSCOSINE:5000
	SCOND1LS:5002	BRATU1D:5003	GRIDGENA:6218
	COSINE:10000	CURLY10:10000	CURLY20:10000
	CURLY30:10000	FLETBV3M:10000	FLETCHBV2:10000
	FLETCHBV3:10000	FLETCHBV:10000	NLMSURF:10000
	OSCIGRAD:10000	SCOSINE:10000	SCURLY10:10000
	SPARSINE:10000	SPMSRTLS:10000	SSCOSINE:10000
	DRCV1LQ:10816	DRCV2LQ:10816	DRCV3LQ:10816
	ODNAMUR	GRIDGENA:12482	NLMSURF:15625
	INDEFM:100000	OSCIGRAD:100000	SSCOSINE:100000
	DEGTRID:100001		

kind of anomalies	112 test problems unsolved by ASACG for $\dim \in [1,100001]$		
n	OSCIGRAD:2	PFIT1LS	PFIT2LS
	PFIT3LS	PFIT4LS	OSCIPATH:5
	Continued on next page		

	PALMER7A	PALMER5E	PALMER5A
	PALMER5B	OSCIGRAD:10	OSCIPATH:10
	OSBORNEB	OSCIGRAD:15	SINEALI:20
	ERRINROS:25	ERRINRSM:25	OSCIGRAD:25
	ANTWERP	X3PK	QR3DLS:40
	MSQRTALS:49	NONMSQRT:49	ERRINROS:50
	HS110:50	PROBPENL:50	SSBRYBND:50
	SCOND1LS:52	RAYBENDS	RAYBENDL:66
	HYDC20LS	FLETCHBV:100	MOREBV:100
	NONMSQRT:100	OSCIGRAD:100	PROBPENL:100
	SCURLY10:100	SSBRYBND:100	SSCOSINE:100
	SCOND1LS:102	NCB20:110	RAYBENDS:130
	QR3DLS	DRCV1LQ	LINVERSE:199
	SPMSRTLS:499	SBRYBND:500	SSBRYBND:500
	SCOND1LS:502	CLPLATEC:529	MSQRTALS:529
	MSQRTBLS:529	NONMSQRT:529	QR3DLS:610
	LINVERSE:999	COSINE	CURLY20
	CURLY30	CHENHARK	FLETCHBV3:1000
	FLETCHBV:1000	POWELLBC:1000	SBRYBND
	SCOSINE	SCURLY10	SSBRYBND
	SSCOSINE	SPMSRTLS:1000	TESTQUAD
	SCOND1LS:1002	CLPLATEC:1024	MSQRTALS:1024
	MSQRTBLS:1024	NONMSQRT:1024	RAYBENDL:1026
	RAYBENDS:1026	DRCV1LQ:1225	DRCV2LQ:1225
	DRCV3LQ:1225	LINVERSE:1999	RAYBENDL:2050
	RAYBENDS:2050	EIGENALS:2550	EIGENCLS:2652
	DRCV1LQ:4489	DRCV2LQ:4489	DRCV3LQ:4489
	SPMSRTLS:4999	CHENHARK:5000	FLETCHBV3:5000
	FLETCHBV:5000	NONCVXUN:5000	SBRYBND:5000
	SCOSINE:5000	SPARSINE:5000	SSCOSINE:5000
	SCOND1LS:5002	CLPLATEC:5041	
t	JIMACK	MSQRTALS:4900	MSQRTBLS:4900
	COSINE:10000	CURLY10:10000	CURLY20:10000
	CURLY30:10000	FLETCHBV3:10000	FLETCHBV:10000
	NONCVXUN:10000	SCOSINE:10000	SCURLY10:10000
	Continued on next page		

	SPARSINE:10000	SPMSRTLS:10000	SSCOSINE:10000
	DRCV1LQ:10816	DRCV2LQ:10816	DRCV3LQ:10816
	ODNAMUR	SSCOSINE:100000	DEGTRID:100001
f	BROWNBS	MDHOLE	ALLINIT
	HATFLDB	HADAMALS	PSPDOC
	OSBORNEA	BIGGS3	MAXLIKA
	PALMER7E	PALMER2E	PALMER3E
	VIBRBEAM	RAYBENDL:10	RAYBENDS:10
	STRATEC	SBRYBND:10	SCOSINE:10
	SCURLY10:10	EXPQUAD:12	QRTQUAD:12
	SCOND1LS	BRATU1D:13	PARKCH
	CLPLATEA:16	CLPLATEB:16	CLPLATEC:16
	HADAMALS:16	LMSURF	NLMSURF:16
	NOBNDTOR:16	TORSION111:16	TORSION1:16
	TORSION2:16	TORSIONA:16	TORSIONB:16
	TORSIONC:16	TORSIOND:16	LINVERSE
	RAYBENDL:24	RAYBENDS:24	HATFLDC
	NONSCOMP	HADAMALS:36	RAYBENDL
	CLPLATEA	CLPLATEB	CLPLATEC
	LMSURF:49	NLMSURF:49	BQPGABIM
	BQPGASIM	NONSCOMP:50	SBRYBND:50
	DECONVU	DECONVB	HADAMALS:64
	LMSURF:64	MINSURF	NLMSURF:64
	RAYBENDS:66	BRATU1D	BIGGSB1:100
	CLPLATEA:100	CLPLATEB:100	CLPLATEC:100
	HADAMALS:100	HS110:100	NOBNDTOR:100
	NONSCOMP:100	SBRYBND:100	SCOSINE:100
	TORSIONA:100	TORSIONB:100	TORSION111:100
	TORSION1:100	TORSION2:100	TORSIONC:100
	TORSIOND:100	TORSION3:100	TORSION4:100
	TORSIONE:100	TORSIONF:100	TORSION5:100
	TORSION6:100	BRATU1D:103	EXPQUAD
	QRTQUAD	LMSURF:121	NLMSURF:121
	RAYBENDL:130	HADAMALS:144	GRIDGENA:170
	DRCV2LQ	DRCV3LQ	HADAMALS:196
	Continued on next page		

HS110:200	HADAMALS:256	ODC:288
SSC:288	HADAMALS:324	HADAMALS:400
JNLBRNG1:400	JNLBRNGA:400	JNLBRNG2:400
JNLBRNGB:400	OBSTCLBL:400	OBSTCLBM:400
OBSTCLBU:400	OBSTCLAE:400	OBSTCLAL:400
NOBNDTOR:484	TORSIONA:484	TORSIONB:484
TORSION111:484	TORSION1:484	TORSION2:484
TORSIONC:484	TORSIOND:484	TORSION3:484
TORSION4:484	TORSIONE:484	TORSIONF:484
TORSION5:484	TORSION6:484	NONSCOMP:500
PENALTY2:500	BRATU1D:503	CLPLATEA:529
CLPLATEB:529	GRIDGENA	ODC
SSC	LMINSURF:961	NLMSURF:961
BIGGSB1:1000	JNLBRNG1:1000	JNLBRNGA:1000
JNLBRNG2:1000	JNLBRNGB:1000	NONSCOMP:1000
OBSTCLBL	OBSTCLBM	OBSTCLBU
OBSTCLAL	OBSTCLAE:1000	PENALTY2:1000
BRATU1D:1003	CLPLATEA:1024	CLPLATEB:1024
HADAMALS:1024	LMINSURF:1024	NLMSURF
NOBNDTOR:1024	TORSIONA:1024	TORSIONB:1024
TORSION111:1024	TORSION1:1024	TORSION2:1024
TORSIONC:1024	TORSIOND:1024	TORSION3:1024
TORSION4:1024	TORSIONE:1024	TORSIONF:1024
TORSION5:1024	TORSION6:1024	EXPQUAD:1200
QRTQUAD:1200	GRIDGENA:1226	BQPGAUSS
GRIDGENA:2114	JNLBRNG1:2300	JNLBRNGA:2300
JNLBRNGB:2300	JNLBRNG2:2300	OBSTCLBL:2300
OBSTCLBM:2300	OBSTCLBU:2300	OBSTCLAE:2300
OBSTCLAL:2300	ODC:2376	SSC:2376
JNLBRNG1:3200	JNLBRNGA:3200	JNLBRNG2:3200
JNLBRNGB:3200	OBSTCLBL:3200	OBSTCLBM:3200
OBSTCLBU:3200	OBSTCLAE:3200	OBSTCLAL:3200
GRIDGENA:3242	JNLBRNG1:3400	JNLBRNGA:3400
JNLBRNG2:3400	JNLBRNGB:3400	HADAMALS:4096
GRIDGENA:4610	BIGGSB1:5000	NONSCOMP:5000
Continued on next page		

QRTQUAD:5000	BRATU1D:5003	CLPLATEA:5041
CLPLATEB:5041	ODC:5184	SSC:5184
MINSURFO:5306	NOBNDTOR:5476	TORSIONA:5476
TORSIONB:5476	TORSION111:5476	TORSION1:5476
TORSION2:5476	TORSIONC:5476	TORSIOND:5476
TORSION3:5476	TORSION4:5476	TORSIONE:5476
TORSIONF:5476	TORSION5:5476	TORSION6:5476
LMSURF:5625	NLMSURF:5625	GRIDGENA:6218
ODC:7344	SSC:7344	JNLBRNG1:7500
JNLBRNGA:7500	JNLBRNG2:7500	JNLBRNGB:7500
OBSTCLBL:7500	OBSTCLBM:7500	OBSTCLBU:7500
OBSTCLAE	OBSTCLAL:7500	JNLBRNG1:10000
JNLBRNGA:10000	JNLBRNG2:10000	JNLBRNGB:10000
LMSURF:10000	NLMSURF:10000	NOBNDTOR:10000
NONSCOMP:10000	OBSTCLBL:10000	OBSTCLBM:10000
OBSTCLBU:10000	OBSTCLAE:10000	OBSTCLAL:10000
TORSIONA:10000	TORSIONB:10000	TORSION111:10000
TORSION1:10000	TORSION2:10000	TORSIONC:10000
TORSIOND:10000	TORSION3:10000	TORSION4:10000
TORSIONE:10000	TORSIONF:10000	GRIDGENA:12482
JNLBRNG1:12500	JNLBRNGA:12500	JNLBRNG2:12500
JNLBRNGB:12500	OBSTCLBL:12500	OBSTCLBM:12500
OBSTCLBU:12500	OBSTCLAE:12500	OBSTCLAL:12500
ODC:14544	SSC:14544	NOBNDTOR:14884
TORSIONA:14884	TORSIONB:14884	TORSION111:14884
TORSION1:14884	TORSION2:14884	TORSIONC:14884
TORSIOND:14884	TORSION3:14884	TORSION4:14884
TORSIONE:14884	TORSIONF:14884	TORSION5:14884
TORSION6:14884	LMSURF:15625	NLMSURF:15625

kind of anomalies	112 test problems unsolved by LMBFG-EIG-MS for $\dim \in [1,100001]$		
n	BROWNBS	DJTL	JENSMP
	Continued on next page		

KOEBHEL	MEYER3	PFIT1LS
PFIT2LS	PFIT3LS	PFIT4LS
OSBORNEA	OSCIGRAD:5	OSCIPATH:5
PALMER7A	PALMER1D	PALMER5E
PALMER6C	PALMER7C	PALMER8C
PALMER1C	PALMER1E	PALMER2C
PALMER3C	PALMER4C	PALMER4E
PALMER5A	PALMER7E	PALMER2E
PALMER3E	VIBRBEAM	NONMSQRT
PALMER5B	OSCIGRAD:10	OSCIPATH:10
STRATEC	SBRYBND:10	SCOSINE:10
SCURLY10:10	SSCOSINE:10	SCOND1LS
OSCIGRAD:15	SINEALI:20	OSCIGRAD:25
ANTWERP	X3PK	WATSON:31
NONMSQRT:49	PROBPENL:50	SBRYBND:50
SSBRYBND:50	SCOND1LS:52	RAYBENDS
DECONVB	RAYBENDL:66	RAYBENDS:66
HYDC20LS	BDEXP	COSINE:100
FLETCHBV:100	NONMSQRT:100	OSCIGRAD:100
PROBPENL:100	SBRYBND:100	SCOSINE:100
SCURLY10:100	SPMSRTLS:100	SSBRYBND:100
SSCOSINE:100	SCOND1LS:102	RAYBENDL:130
RAYBENDS:130	QR3DLS	DRCV1LQ
LINVERSE:199	SPMSRTLS:499	SBRYBND:500
SSBRYBND:500	SCOND1LS:502	MSQRTALS:529
MSQRTBLS:529	NONMSQRT:529	QR3DLS:610
LINVERSE:999	COSINE	CURLY20
CURLY30	CHENHARK	FLETCHBV:1000
NONCVXUN	OSCIGRAD:1000	SBRYBND
SCOSINE	SCURLY10	SSCOSINE
SPMSRTLS:1000	SCOND1LS:1002	MSQRTALS:1024
MSQRTBLS:1024	NONMSQRT:1024	RAYBENDL:1026
RAYBENDS:1026	DRCV1LQ:1225	DRCV2LQ:1225
DRCV3LQ:1225	LINVERSE:1999	RAYBENDL:2050
RAYBENDS:2050	EIGENALS:2550	DRCV1LQ:4489
Continued on next page		

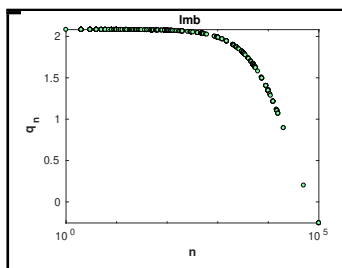
	DRCV2LQ:4489	DRCV3LQ:4489	SPMSRTL:4999
	NONCVXUN:5000	NONDIA:5000	QRTQUAD:5000
	SBRYBND:5000	SPARSINE:5000	SSCOSINE:5000
	SCOND1LS:5002	CLPLATEC:5041	
t	MSQRTALS:4900	MSQRTBLS:4900	FLETCHBV3:5000
	FLETCHBV:5000	INDEF:5000	SCOSINE:5000
	COSINE:10000	CURLY10:10000	CURLY20:10000
	CURLY30:10000	FLETCHBV3:10000	FLETCHBV:10000
	NONCVXUN:10000	OSCIGRAD:10000	SCOSINE:10000
	SCURLY10:10000	SPARSINE:10000	SPMSRTL:10000
	SSCOSINE:10000	DRCV1LQ:10816	DRCV2LQ:10816
	DRCV3LQ:10816	ODNAMUR	OSCIGRAD:100000
	SSCOSINE:100000	DEGTRID:100001	
f	HS110	NCVXBQP3:10	QUDLIN
	TORSION3:16	TORSION4:16	HS110:50
	HS110:100	QUDLIN:120	GRIDGENA:170
	HS110:200	PENALTY3:200	BDEXP:500
	PENALTY2:500	GRIDGENA	BDEXP:1000
	INDEF	NCVXBQP3	PENALTY2:1000
	QUDLIN:1200	GRIDGENA:1226	GRIDGENA:2114
	GRIDGENA:3242	JIMACK	GRIDGENA:4610
	BRATU1D:5003	GRIDGENA:6218	NCVXBQP3:10000
	GRIDGENA:12482		

3.5 Timing analysis

$x_i \geq 0$, for $i = 1, 2, 3, 4$, are obtained by at least squares fit of

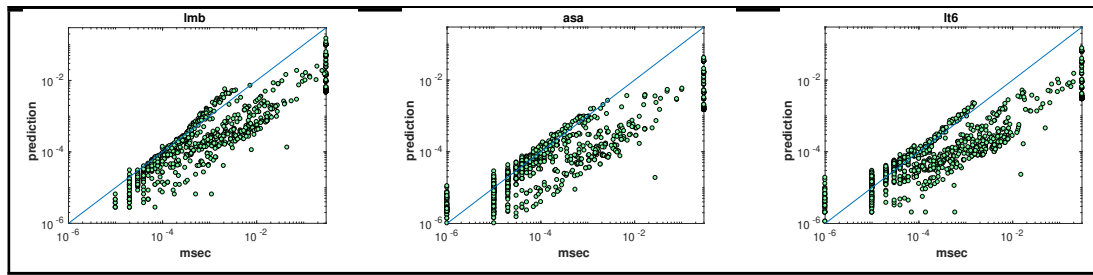
$$msec = (x_1 + x_2 * dim) * nf + (x_3 + x_4 * dim) * ng.$$

Comparison of $q_n := \frac{x_3 + dim * x_4}{x_1 + dim * x_2}$ versus dimension:



solver	x_1	x_2	x_3	x_4
lmb	9.2951e-07	0	0	0
asa	7.1813e-08	2.2516e-12	2.2138e-07	0
lt6	2.7614e-07	0	3.142e-07	0

Comparison of predicted time versus actual time used:



3.6 nf2g efficiency for accuracy 1e-06

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
BQP1VAR	1	1	3	100	100	100
AKIVA	2	—	70	84	79	100
BEALE	2	—	49	79	96	100
BRKMCC	2	—	27	93	100	79
CAMEL6	2	—	25	44	66	100
CLIFF	2	—	73	42	41	100
CUBE	2	—	114	74	77	100
CHEBYQAD:2	2	—	38	67	84	100
DENSCHNA	2	—	28	76	90	100
DENSCHNB	2	—	28	85	72	100
DENSCHNC	2	—	40	74	85	100
DENSCHNF	2	—	36	77	68	100
DJTL	2	—	270	100	22	—
ENGVAL1	2	—	25	68	83	100
EXPFIT	2	—	53	95	78	100
FREUROTH	2	—	43	63	100	78
HUMPS	2	—	135	73	44	100
HAIRY	2	—	58	63	59	100
HIMMELBB	2	—	22	49	58	100
HIMMELBG	2	—	35	95	100	92
HIMMELBH	2	—	22	76	71	100
HS1	2	—	104	92	88	100
HS5	2	—	26	79	90	100
HILBERTA:2	2	—	11	85	100	39
HIMMELP1	2	1	22	43	92	100
HS2	2	1	32	91	100	91
HS3MOD	2	1	4	17	100	25
HS3	2	1	4	31	100	40
HS4	2	2	3	100	100	100
JENSMP	2	—	152	57	100	—
LOGHAIRY	2	—	74	100	58	91

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
LOGROS	2	—	182	49	81	100
MARATOSB	2	—	3169	69	44	100
MEXHAT	2	—	330	78	54	100
MODBEALE	2	—	49	79	96	100
MDHOLE	2	1	9	100	100	90
OSCIGRAD:2	2	—	5382	89	—	100
OSCIPATH:2	2	—	202	77	59	100
ROSENBR	2	—	103	100	82	99
S308	2	—	28	85	80	100
SINEVAL	2	—	47	96	100	96
SISSER	2	—	35	55	100	67
SNAIL	2	—	25	76	93	100
SENSORS:2	2	—	31	94	100	82
SIMBQP	2	1	4	44	100	40
SIM2BQP	2	2	3	100	100	100
ZANGWIL2	2	—	11	85	100	50
BARD	3	—	174	62	100	72
BOX3	3	—	23	68	100	82
BOX2	3	1	113	81	100	44
DENSCHND	3	—	64	100	69	76
DENSCHNE	3	—	27	52	100	96
ENGVAL2	3	—	107	84	100	88
EG1	3	1	81	90	100	98
GROWTHLS	3	—	94	100	47	90
GULF	3	—	4	14	100	2
HATFLDD	3	—	71	54	100	56
HATFLDE	3	—	74	83	56	100
HATFLDFL	3	—	405	18	63	100
HELIX	3	—	43	96	100	70
HIELOW	3	—	74	77	85	100
HS25	3	—	8	100	23	2
KOEBHELB	3	—	195	73	100	—

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
MEYER3	3	—	876	100	28	—
PFIT1LS	3	—	52	100	—	—
PFIT2LS	3	—	52	100	—	—
PFIT3LS	3	—	52	100	—	—
PFIT4LS	3	—	52	100	—	—
SCHMVETT	3	—	54	71	100	82
SENSORS:3	3	—	97	63	97	100
SPECAN:3	3	3	3	100	100	100
WEEDS	3	1	72	64	29	100
YFIT	3	—	225	41	100	62
YFITU	3	—	364	92	79	100
ALLINITU	4	—	31	56	89	100
ALLINIT	4	2	41	71	80	100
BROWNDEN	4	—	72	89	100	85
CRAGGLVY	4	—	134	61	86	100
CHAINWOO:4	4	—	98	86	100	90
CHEBYQAD:4	4	—	48	25	44	100
HATFLDA	4	—	67	41	58	100
HIMMELBF	4	—	293	87	100	75
HS38	4	—	102	93	100	94
HILBERTA:4	4	—	19	90	100	26
HATFLDB	4	1	109	71	100	82
HADAMALS	4	3	37	97	100	74
KOWOSB	4	—	188	100	95	68
MSQRTALS	4	—	63	72	100	97
MODBEALE:4	4	—	76	100	74	74
PENALTY2	4	—	1538	48	93	100
POWELLSG	4	—	120	90	100	100
PALMER1B	4	—	29	100	7	15
PALMER2B	4	—	31	100	8	14
PALMER3B	4	—	26	100	6	25
PALMER4B	4	—	31	100	10	23

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
PALMER5D	4	—	21	100	88	22
PENALTY1:4	4	—	391	57	98	100
PSPDOC	4	1	25	100	78	68
PALMER1	4	1	116	82	37	100
PALMER2	4	1	79	75	66	100
PALMER3	4	1	77	54	83	100
PALMER4	4	1	91	69	93	100
POWELLBC:4	4	4	4	80	100	100
SINEALI:4	4	—	270	100	84	99
WOODS:4	4	—	102	95	100	94
CHEBYQAD:5	5	2	61	56	82	100
EXTROSNB	5	—	322	55	85	100
GENHUMPS:5	5	—	254	76	76	100
GENROSE:5	5	—	137	63	77	100
HILBERTB	5	—	19	90	100	100
HILBERTA:5	5	—	23	92	100	16
HS45	5	5	3	100	100	100
OSBORNEA	5	5	28	100	—	—
OSCIGRAD:5	5	—	5142	100	93	—
SINQUAD	5	—	50	89	78	100
TQUARTIC	5	—	54	78	79	100
BIGGS6	6	—	494	6	100	25
BIGGS5	6	1	216	45	94	100
BIGGS3	6	3	76	65	86	100
CHEBYQAD:6	6	2	62	43	100	67
EIGENALS:6	6	—	109	86	84	100
EIGENBLS:6	6	—	101	74	65	100
HEART6LS	6	—	3316	60	100	85
HILBERTA:6	6	—	23	92	100	16
HART6	6	2	59	100	80	95
PALMER6A	6	—	33	100	2	2

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
PALMER7A	6	—	37	100	—	—
PALMER8A	6	—	33	100	6	11
PALMER1A	6	—	45	100	4	4
PALMER2A	6	—	45	100	6	4
PALMER3A	6	—	33	100	3	4
PALMER4A	6	—	33	100	4	6
PALMER5C	6	—	27	93	100	53
SPECAN:6	6	6	3	100	100	100
CHEBYQAD:7	7	1	107	48	100	67
PALMER1D	7	—	33	100	60	—
AIRCRFTB	8	3	250	53	49	100
CHEBYQAD:8	8	2	96	29	100	56
HEART8LS	8	—	688	22	14	100
MAXLIKA	8	7	8	100	36	18
OSLBQP	8	7	4	40	57	100
PALMER6C	8	—	37	100	51	—
PALMER6E	8	—	70	6	100	1
PALMER7C	8	—	37	100	51	—
PALMER8C	8	—	37	100	71	—
PALMER8E	8	—	84	12	100	1
PALMER1C	8	—	37	100	45	—
PALMER1E	8	—	1295	53	100	—
PALMER2C	8	—	37	100	47	—
PALMER3C	8	—	37	100	65	—
PALMER4C	8	—	37	100	65	—
PALMER4E	8	—	1045	100	32	—
PALMER5A	8	—	41	100	—	—
POWELLSG:8	8	—	203	75	100	68
PALMER7E	8	1	9017	100	—	—
PALMER2E	8	1	2136	100	—	—
PALMER3E	8	1	2093	100	—	—

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
S368:8	8	6	34	100	94	56
VIBRBEAM	8	—	2753	100	—	—
CHEBYQAD:9	9	2	98	32	100	47
MSQRTBLS	9	—	100	78	88	100
NONMSQRT	9	—	833	16	100	—
SPECAN:9	9	9	3	100	100	100
ARGLINA:10	10	—	7	78	100	58
ARGLINB:10	10	—	7	54	100	54
ARGLINC:10	10	—	7	54	100	50
BROWNAL	10	—	75	100	100	68
BRYBND	10	—	269	40	100	99
BOXPOWER:10	10	—	21	100	49	46
BOX:10	10	—	41	100	87	79
BROYDN7D:10	10	—	94	54	82	100
CHNROSNB	10	—	217	64	96	100
CHNRSNBM	10	—	231	64	99	100
CHARDIS0:10	10	—	4	44	100	40
COSINE:10	10	—	102	100	82	68
CRAGGLVY:10	10	—	133	82	98	100
CHEBYQAD	10	2	63	20	100	39
CHENHARK:10	10	3	61	97	77	100
CVXBQP1:10	10	10	3	100	100	100
DIXON3DQ	10	—	45	100	96	54
DQDRTIC	10	—	23	92	100	38
DQRTIC:10	10	—	83	64	77	100
ERRINROS:10	10	—	370	71	100	96
ERRINRSM:10	10	—	777	73	100	64
EXTROSNB:10	10	—	3234	51	100	95
FLETBV3M	10	—	37	56	79	100
FLETGBV2	10	—	47	96	100	73
FLETGBV3	10	—	67	44	64	100

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
FLETCHBV	10	—	112	62	45	100
FLETCHCR	10	—	229	62	91	100
FREUROTH:10	10	—	74	100	99	81
GENHUMPS:10	10	—	480	58	65	100
GENROSE:10	10	—	232	60	90	100
HS110	10	—	35	43	100	—
HILBERTA:10	10	—	23	92	100	14
HILBERTB:10	10	—	19	90	100	100
HARKERP2:10	10	10	3	100	100	100
INDEFM:10	10	—	126	100	85	83
INDEF:10	10	10	53	16	100	71
MOREBV	10	—	71	86	100	51
MANCINO:10	10	—	26	90	96	100
MODBEALE:10	10	—	146	100	91	19
MCCORMCK	10	1	54	84	100	60
NONCVXU2:10	10	—	75	63	79	100
NONCVXUN:10	10	—	71	100	90	89
NONDIA:10	10	—	106	79	82	100
NCVXBQP1:10	10	10	8	100	29	62
NCVXBQP2:10	10	10	5	100	19	45
NCVXBQP3:10	10	10	8	100	24	8
POWER	10	—	67	72	89	100
PENALTY1:10	10	—	313	74	83	100
PENALTY2:10	10	—	1469	71	81	100
PROBPENL:10	10	4	827	100	100	19
POWELLBC:10	10	7	17	29	23	100
RAYBENDL:10	10	4	90	73	100	92
RAYBENDS:10	10	4	154	70	66	100
SINEALI	10	—	3666	55	100	98
SROSENBR	10	—	169	100	93	52

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SCHMVETT:10	10	—	90	86	100	89
SENSORS:10	10	—	60	100	54	86
SPARSINE:10	10	—	53	100	84	47
SPARSQUR:10	10	—	34	47	100	51
SSBRYBND:10	10	—	737	85	100	8
SSCOSINE:10	10	—	372	100	78	—
TOINTGSS	10	—	108	100	83	70
TQUARTIC:10	10	—	82	69	100	95
TRIDIA:10	10	—	45	100	96	54
VARDIM	10	—	67	55	100	75
VAREIGVL:10	10	—	46	78	84	100
OSBORNEB	11	—	3847	—	—	100
EXPQUAD:12	12	4	118	52	100	66
QRTQUAD:12	12	3	223	100	100	51
QUDLIN	12	12	8	100	38	26
WATSON:12	12	—	238	75	100	73
BRATU1D:13	13	2	65	100	88	64
DIXMAANA	15	—	19	76	100	100
DIXMAANB	15	—	19	76	100	100
DIXMAANC	15	—	19	66	83	100
DIXMAAND	15	—	25	86	93	100
DIXMAANE	15	—	61	94	60	100
DIXMAANF	15	—	61	94	73	100
DIXMAANG	15	—	64	98	74	100
DIXMAANH	15	—	61	94	70	100
DIXMAANI	15	—	113	100	60	85
DIXMAANJ	15	—	124	100	64	97

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANK	15	—	133	100	67	98
DIXMAANL	15	—	113	100	58	90
DIXMAANM	15	—	93	100	51	62
DIXMAANN	15	—	113	100	63	86
DIXMAANO	15	—	115	98	56	100
DIXMAANP	15	—	131	86	69	100
PARKCH	15	—	693	100	—	10
CLPLATEA:16	16	4	81	93	100	94
CLPLATEB:16	16	4	83	100	98	100
CLPLATEC:16	16	4	69	100	85	53
FMINSURF	16	—	64	100	77	96
FMINSRF2:16	16	—	82	95	80	100
HADAMALS:16	16	8	109	97	100	50
LMINSURF	16	12	41	89	100	100
NLMSURF:16	16	12	49	78	94	100
NOBNDTOR:16	16	13	36	95	100	48
POWELLSG:16	16	—	366	100	55	75
TORSION111:16	16	14	22	100	100	45
TORSION1:16	16	14	22	100	100	45
TORSION2:16	16	14	22	100	100	45
TORSIONA:16	16	14	22	85	100	69
TORSIONB:16	16	14	22	85	100	69
TORSIONC:16	16	14	22	100	100	88
TORSIOND:16	16	14	22	100	100	88
TORSION3:16	16	16	7	58	100	23
TORSION4:16	16	16	7	58	100	23
TORSION5:16	16	16	4	31	100	80
TORSION6:16	16	16	4	31	100	80
TORSIONE:16	16	16	4	44	100	29
TORSIONF:16	16	16	4	44	100	29
CHARDIS0:18	18	—	4	44	100	40

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
LINVERSE	19	8	240	19	100	50
CHEBYQAD:20	20	3	127	56	100	70
MANCINO:20	20	—	31	84	100	100
NONDIA:20	20	—	147	74	100	93
POWELLSG:20	20	—	390	100	65	58
POWER:20	20	—	79	56	66	100
POWELLBC:20	20	13	107	100	91	51
TRIDIA:20	20	—	85	100	83	56
NCB20B	21	—	190	100	37	77
NCB20B:22	22	—	254	100	39	36
RAYBENDL:24	24	4	1152	50	—	100
RAYBENDS:24	24	4	3570	42	—	100
BIGGSB1	25	3	221	77	71	100
CHNROSNB:25	25	—	383	57	48	100
CHNRSNBM:25	25	—	632	78	69	100
ERRINROS:25	25	—	452	69	—	100
ERRINRSM:25	25	—	1254	100	—	40
HATFLDC	25	12	49	82	71	100
NONSCOMP	25	12	333	81	100	80
OSCIPATH:25	25	—	182	83	81	100
QUARTC	25	—	39	30	100	41
SPMSRTLS	28	—	175	76	73	100
X3PK	30	1	4414	100	—	—
EIGENCLS:30	30	—	520	100	85	95
MANCINO:30	30	—	32	86	91	100
NONDIA:30	30	—	184	100	97	84
POWER:30	30	—	79	65	62	100
TRIDIA	30	—	129	100	80	58
WATSON:31	31	—	1408	100	24	—

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
EDENSCH	36	—	70	82	71	100
HADAMALS:36	36	24	192	70	100	59
LIARWHD	36	—	73	61	71	100
POWELLSG:36	36	—	421	100	56	40
CHARDIS0:40	40	—	4	44	100	40
POWELLSG:40	40	—	414	100	56	49
QR3DLS:40	40	1	4330	100	—	61
RAYBENDL	44	4	8754	—	—	100
CLPLATEA	49	7	143	72	57	100
CLPLATEB	49	7	137	71	57	100
CLPLATEC	49	7	288	100	71	53
FMINSRF2:49	49	—	142	93	90	100
FMINSURF:49	49	—	112	90	77	100
LMINSURF:49	49	24	96	70	72	100
MSQRTALS:49	49	—	733	82	—	100
MSQRTBLS:49	49	—	584	100	64	99
NLMSURF:49	49	24	381	80	60	100
ARGLINA:50	50	—	7	78	100	54
ARGLINB:50	50	—	7	41	100	41
ARGLINC:50	50	—	7	33	100	41
BROYDN7D:50	50	—	290	75	59	100
BRYBND:50	50	—	67	87	85	100
BQPGABIM	50	26	119	100	99	72
BQPGASIM	50	27	108	100	91	57
CHNROSNB:50	50	—	730	69	63	100
CHNRSNBM:50	50	—	1013	69	91	100
CRAGGLVY:50	50	—	256	77	75	100
CHEBYQAD:50	50	6	196	34	15	100
CVXBQP1:50	50	50	3	100	100	100
DQDRTIC:50	50	—	23	92	100	18
DQRTIC:50	50	—	43	33	100	41

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
ENGVAL1:50	50	—	60	72	78	100
ERRINROS:50	50	—	445	67	—	100
ERRINRSM:50	50	—	1455	100	14	46
FREUROTH:50	50	—	78	100	87	99
HILBERTB:50	50	—	19	90	100	86
INDEFM:50	50	—	202	23	74	100
INDEF:50	50	50	56	18	100	26
MANCINO:50	50	—	37	74	95	100
MOREBV:50	50	—	1539	24	100	29
MCCORMCK:50	50	1	56	88	100	55
NCB20B:50	50	—	1024	100	24	46
NONDIA:50	50	—	145	100	73	53
NONSCOMP:50	50	25	266	70	91	100
NCVXBQP3:50	50	49	34	100	65	26
NCVXBQP1:50	50	50	5	100	18	36
NCVXBQP2:50	50	50	22	100	58	19
PENALTY3	50	—	1179	47	72	100
PENALTY1:50	50	—	234	47	76	100
PENALTY2:50	50	—	482	100	66	97
POWER:50	50	—	91	69	85	100
PROBPENL:50	50	—	8204	100	—	—
PENTDI:50	50	37	28	76	88	100
SINQUAD:50	50	—	104	94	84	100
SPARSINE:50	50	—	469	100	58	78
SPARSQUR:50	50	—	24	30	100	36
SROSENBR:50	50	—	205	84	100	55
SSBRYBND:50	50	—	5532	100	—	—
S368:50	50	32	9	14	20	100
TOINTGOR	50	—	396	85	77	100
TOINTPSP	50	—	284	100	43	82

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TOINTQOR	50	—	113	100	80	85
TOINTGSS:50	50	—	135	92	70	100
TQUARTIC:50	50	—	110	100	49	55
TRIDIA:50	50	—	217	100	84	76
VAREIGVL	50	—	64	79	81	100
VARDIM:50	50	—	101	60	100	68
CHARDIS0:60	60	—	4	44	100	40
POWELLSG:60	60	—	432	100	61	42
DECONVU	61	10	3206	100	30	39
DECONVB	61	41	483	45	100	—
FMINSRF2	64	—	184	86	94	100
FMINSURF:64	64	—	150	100	94	98
HADAMALS:64	64	34	177	54	100	52
LMINSURF:64	64	28	127	67	82	100
MINSURF	64	28	85	75	93	100
NLMSURF:64	64	28	482	70	69	100
POWER:75	75	—	109	72	74	100
BRATU1D	77	2	1035	87	67	100
POWELLSG:80	80	—	568	100	70	63
DIXMAANA:90	90	—	15	71	100	94
DIXMAANB:90	90	—	19	76	100	100
DIXMAANC:90	90	—	22	76	96	100
DIXMAAND:90	90	—	25	86	93	100
DIXMAANE:90	90	—	158	96	74	100
DIXMAANF:90	90	—	172	100	86	98
DIXMAANG:90	90	—	144	83	75	100
DIXMAANH:90	90	—	172	91	90	100
DIXMAANI:90	90	—	529	100	72	73

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANJ:90	90	—	600	100	83	82
DIXMAANK:90	90	—	653	100	97	85
DIXMAANL:90	90	—	588	100	91	81
DIXMAANM:90	90	—	501	100	76	62
DIXMAANN:90	90	—	720	95	73	100
DIXMAANO:90	90	—	853	98	90	100
DIXMAANP:90	90	—	690	87	70	100
NONDIA:90	90	—	177	100	41	37
ARGLINA:100	100	—	7	78	100	54
ARGLINB:100	100	—	13	100	38	48
ARGLINC:100	100	—	52	100	71	66
ARWHEAD:100	100	—	57	85	76	100
BDQRTIC	100	—	133	84	45	100
BOXPOWER:100	100	—	27	93	100	49
BOX:100	100	—	83	100	90	81
BROWNAL:100	100	—	74	100	66	25
BROYDN7D:100	100	—	415	78	71	100
BRYBND:100	100	—	64	74	77	100
BDEXP	100	2	315	4	100	—
BIGGSB1:100	100	3	904	53	48	100
CHARDIS0	100	—	4	44	100	40
CHAINWOO:100	100	—	1049	50	100	87
COSINE:100	100	—	946	100	37	—
CRAGGLVY:100	100	—	257	68	64	100
CURLY10:100	100	—	3726	66	86	100
CURLY20:100	100	—	3064	100	39	77
CURLY30:100	100	—	2324	100	26	58
CHEBYQAD:100	100	4	293	44	5	100
CLPLATEA:100	100	10	203	74	72	100
CLPLATEB:100	100	10	208	88	80	100
CLPLATEC:100	100	10	705	100	93	73

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
CHENHARK:100	100	30	5420	79	100	78
CVXBP1	100	100	3	100	100	100
DIXON3DQ:100	100	—	405	100	81	39
DQDRTIC:100	100	—	23	92	100	62
DQRTIC:100	100	—	51	27	100	46
ENGVAL1:100	100	—	61	79	74	100
EXTROSNB:100	100	—	4860	44	48	100
FLETBV3M:100	100	—	89	65	100	100
FLETBVC2:100	100	—	660	100	88	74
FLETBVC3:100	100	—	469	10	5	100
FLETCHCR:100	100	—	1782	60	71	100
FREUROTH:100	100	—	74	100	62	86
GENHUMPS:100	100	—	1024	73	55	100
GENROSE:100	100	—	1756	59	72	100
HADAMALS:100	100	76	372	58	38	100
HARKERP2	100	100	3	100	100	100
INDEFM:100	100	—	262	55	28	100
INDEF:100	100	100	51	26	100	22
LIARWHD:100	100	—	74	100	72	87
MANCINO:100	100	—	42	63	98	100
MOREBV:100	100	—	9288	100	—	80
MSQRTALS:100	100	—	1276	49	37	100
MSQRTBLS:100	100	—	2164	70	55	100
MCCORMCK:100	100	1	56	88	100	79
NONDQUAR	100	—	514	100	43	43
NCB20B:100	100	—	1948	100	20	56
NONCVXU2:100	100	—	1483	84	100	96
NONCVXUN:100	100	—	567	98	100	84
NONDIA:100	100	—	369	100	55	72

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
NOBNDTOR:100	100	49	155	100	99	93
NONSCOMP:100	100	50	240	74	100	95
NCVXBQP3:100	100	98	43	100	74	39
NCVXBQP1:100	100	100	5	100	18	36
NCVXBQP2:100	100	100	21	100	57	21
OSCIPATH:100	100	—	228	81	100	93
PENALTY1:100	100	—	217	45	82	100
PENALTY2:100	100	—	265	66	45	100
PENALTY3:100	100	—	2686	51	84	100
POWELLSG:100	100	—	530	100	79	58
POWER:100	100	—	112	65	85	100
PROBPENL:100	100	—	43	100	—	—
PENTDI:100	100	74	30	71	100	41
QUARTC:100	100	—	51	27	100	46
SCHMVETT:100	100	—	156	66	78	100
SENSORS:100	100	—	85	75	82	100
SINEALI:100	100	—	219	89	37	100
SINQUAD:100	100	—	97	95	100	92
SPARSINE:100	100	—	829	100	70	89
SPARSQUR:100	100	—	27	30	100	39
SPMSRTLS:100	100	—	1449	—	100	—
SROSENBR:100	100	—	183	81	100	42
SSBRYBND:100	100	—	10936	100	—	—
S368:100	100	73	10	20	16	100
TOINTGSS:100	100	—	103	80	66	100
TQUARTIC:100	100	—	218	90	79	100
TRIDIA:100	100	—	341	100	82	65

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSIONA:100	100	54	118	72	100	92
TORSIONB:100	100	54	118	72	100	92
TORSION111:100	100	58	102	78	93	100
TORSION1:100	100	58	102	78	93	100
TORSION2:100	100	58	102	78	93	100
TORSIONC:100	100	67	82	89	100	86
TORSIOND:100	100	67	82	89	100	86
TORSION3:100	100	71	78	100	98	66
TORSION4:100	100	71	78	100	98	66
TORSIONE:100	100	84	50	74	100	70
TORSIONF:100	100	84	50	74	100	70
TORSION5:100	100	86	46	73	100	94
TORSION6:100	100	86	46	73	100	94
VARDIM:100	100	—	122	56	100	74
VAREIGVL:100	100	—	73	86	84	100
WOODS:100	100	—	237	100	54	45
EXPLIN:101	101	95	166	62	100	52
EXPLIN2:101	101	101	5	100	71	23
BRATU1D:103	103	2	1084	68	52	100
EIGENALS	110	—	4266	75	88	100
EIGENBLS	110	—	2141	66	100	92
NCB20:110	110	—	1162	100	—	37
EXPQUAD	120	7	214	86	100	88
EXPLIN	120	70	543	100	73	96
EXPLIN2	120	101	215	68	100	54
QRTQUAD	120	5	269	100	68	52
QUDLIN:120	120	120	8	100	38	11
FMINSRF2:121	121	—	214	99	95	100
FMINSURF:121	121	—	176	89	93	100
LMINSURF:121	121	40	170	61	79	100
NLMSURF:121	121	40	946	55	66	100

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
HADAMALS:144	144	79	287	48	100	84
HOLMES	180	180	3	100	100	100
NCB20B:180	180	—	1298	61	44	100
DRCV2LQ	196	96	4966	97	100	97
DRCV3LQ	196	96	9829	90	100	88
HADAMALS:196	196	161	468	61	100	91
ARGLINA:200	200	—	7	78	100	50
ARGLINB:200	200	—	28	60	100	97
ARGLINC:200	200	—	23	74	82	100
BROWNAL:200	200	—	75	100	67	17
CHARDIS0:200	200	—	4	44	100	40
MODBEALE:200	200	—	409	100	64	23
PENALTY2:200	200	—	550	—	57	100
PENALTY3:200	200	—	6757	64	100	—
POWELLBC:200	200	104	2638	100	29	96
VARDIM:200	200	—	120	54	100	62
HADAMALS:256	256	135	502	73	100	72
ODC:288	288	148	606	64	46	100
SSC:288	288	148	390	89	83	100
DIXMAANA:300	300	—	15	88	100	94
DIXMAANB:300	300	—	19	76	100	100
DIXMAANC:300	300	—	22	76	96	100
DIXMAAND:300	300	—	25	86	93	100
DIXMAANE:300	300	—	277	100	81	96
DIXMAANF:300	300	—	236	74	75	100

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANG:300	300	—	239	89	79	100
DIXMAANH:300	300	—	233	79	76	100
DIXMAANI:300	300	—	1781	100	64	76
DIXMAANJ:300	300	—	1452	91	85	100
DIXMAANK:300	300	—	1397	90	84	100
DIXMAANL:300	300	—	1248	79	89	100
DIXMAANM:300	300	—	1761	100	63	86
DIXMAANN:300	300	—	1904	94	100	89
DIXMAANO:300	300	—	1952	97	100	93
DIXMAANP:300	300	—	1868	100	96	79
HADAMALS:324	324	256	499	46	100	88
CHARDIS0:400	400	—	4	31	100	40
HADAMALS:400	400	306	545	34	51	100
JNLBRNG1:400	400	253	274	86	60	100
JNLBRNGA:400	400	253	317	65	71	100
JNLBRNG2:400	400	278	295	69	81	100
JNLBRNGB:400	400	302	399	100	82	96
OBSTCLBL:400	400	263	28	33	100	30
OBSTCLBM:400	400	263	28	33	100	30
OBSTCLBU:400	400	263	28	33	100	30
OBSTCLAE:400	400	398	9	100	47	29
OBSTCLAL:400	400	398	9	100	47	29
EIGENCLS	462	—	7080	100	57	94
NOBNDTOR:484	484	143	192	54	55	100
TORSIONA:484	484	161	202	58	75	100
TORSIONB:484	484	161	202	58	75	100
TORSION111:484	484	186	184	61	51	100
TORSION1:484	484	186	184	61	51	100
TORSION2:484	484	186	184	61	51	100
TORSIONC:484	484	254	154	74	87	100
TORSIOND:484	484	254	154	74	87	100
TORSION3:484	484	267	193	100	99	98

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSION4:484	484	267	193	100	99	98
TORSIONE:484	484	362	107	68	86	100
TORSIONF:484	484	362	107	68	86	100
TORSION5:484	484	368	116	70	92	100
TORSION6:484	484	368	116	70	92	100
ARWHEAD:500	500	—	68	93	100	79
BDQRTIC:500	500	—	148	100	32	74
BROYDN7D:500	500	—	538	72	76	100
BRYBND:500	500	—	64	75	77	100
BDEXP:500	500	2	1514	—	100	—
CRAGGLVY:500	500	—	290	73	68	100
DQRTIC	500	—	59	22	100	43
DQDRTIC:500	500	—	23	92	100	51
FREUROTH:500	500	—	96	98	100	72
GENHUMPS:500	500	—	953	56	55	100
GENROSE:500	500	—	8466	57	95	100
HARKERP2:500	500	500	3	100	100	100
LIARWHD:500	500	—	99	100	63	97
MOREBV:500	500	—	1489	91	55	100
MCCORMCK:500	500	1	56	79	100	71
NCB20B:500	500	—	1055	100	35	76
NONDIA:500	500	—	663	100	56	70
NONDQUAR:500	500	—	569	100	52	59
NONSCOMP:500	500	250	266	82	100	99
OSCIPATH:500	500	—	211	97	95	100
PENALTY1:500	500	—	169	67	77	100
POWELLSG:500	500	—	645	100	85	69
POWER:500	500	—	255	95	93	100
PROBPENL:500	500	—	7	78	100	50
PENTDI:500	500	376	28	76	100	100

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
QUARTC:500	500	—	59	22	100	43
SCHMVETT:500	500	—	159	10	69	100
SINQUAD:500	500	—	155	85	100	79
SROSENBR:500	500	—	270	100	94	70
TOINTGSS:500	500	—	109	97	81	100
TQUARTIC:500	500	—	481	94	100	97
TRIDIA:500	500	—	857	100	81	64
VAREIGVL:500	500	—	73	78	84	100
BRATU1D:503	503	2	6081	—	39	100
CLPLATEA:529	529	23	552	85	76	100
CLPLATEB:529	529	23	428	82	76	100
CLPLATEC:529	529	23	1972	100	—	24
ODC	864	164	576	84	67	100
SSC	864	164	397	90	71	100
FMINSRF2:961	961	—	271	47	87	100
FMINSURF:961	961	—	331	100	78	87
LMINSURF:961	961	120	607	46	73	100
NLMSURF:961	961	120	4301	57	68	100
ARWHEAD:1000	1000	—	64	83	100	66
BDQRTIC:1000	1000	—	171	100	37	52
BOXPOWER:1000	1000	—	42	86	100	54
BOX:1000	1000	—	141	87	100	71
BROWNAL:1000	1000	—	107	100	99	59

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
BROYDN7D:1000	1000	—	526	58	71	100
BRYBND:1000	1000	—	64	70	77	100
BDEXP:1000	1000	2	3017	—	100	—
BIGGSB1:1000	1000	3	7917	76	53	100
CHAINWOO	1000	—	903	100	79	73
CURLY10	1000	—	25995	—	95	100
CHARDIS0:1000	1000	—	4	31	100	40
CRAGGLVY:1000	1000	—	271	73	64	100
CVXBQP1:1000	1000	1000	3	100	100	100
DIXON3DQ:1000	1000	—	4005	100	80	36
DQDRTIC:1000	1000	—	23	92	100	39
DQRTIC:1000	1000	—	63	24	100	44
EG2	1000	—	428	100	69	68
ENGVAL1:1000	1000	—	66	68	90	100
EXTROSNB:1000	1000	—	4970	28	47	100
FLETBV3M:1000	1000	—	52	34	100	59
FLETGBV2:1000	1000	—	4009	100	44	62
FLETGBV3:1000	1000	—	14177	—	—	100
FLETCHCR:1000	1000	—	16834	56	98	100
FREUROTH:1000	1000	—	76	84	80	100
GENHUMPS	1000	—	1097	78	68	100
HARKERP2:1000	1000	1000	3	100	100	100
INDEFM	1000	—	558	—	81	100
INDEF	1000	1000	53	30	100	17
JNLBRNG1:1000	1000	366	278	74	62	100
JNLBRNGA:1000	1000	385	329	60	60	100
JNLBRNG2:1000	1000	524	505	71	54	100

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
JNLBRNGB:1000	1000	560	1347	93	68	100
LIARWHD:1000	1000	—	108	100	81	71
MOREBV:1000	1000	—	1468	65	50	100
MCCORMCK:1000	1000	1	59	83	100	94
NONCVXU2	1000	—	5407	100	96	70
NONCVXUN	1000	—	10021	59	100	—
NONDIA	1000	—	1340	74	65	100
NCB20B:1000	1000	—	1244	100	40	82
NONDQUAR:1000	1000	—	618	100	82	77
NONSCOMP:1000	1000	500	274	94	97	100
NCVXBQP3	1000	983	93	100	89	62
NCVXBQP2	1000	993	80	88	100	61
NCVXBQP1	1000	1000	5	100	18	31
OSCIGRAD:1000	1000	—	1486	—	100	—
OBSTCLBL	1000	680	170	80	100	81
OBSTCLBM	1000	680	170	80	100	81
OBSTCLBU	1000	680	170	80	100	81
OBSTCLAL	1000	696	72	43	100	73
OBSTCLAE:1000	1000	696	72	43	100	73
PENALTY1:1000	1000	—	151	48	83	100
POWELLSG:1000	1000	—	575	100	59	57
POWER:1000	1000	—	348	90	92	100
POWELLBC:1000	1000	501	10829	—	—	100
PENTDI	1000	751	25	68	89	100
QUARTC:1000	1000	—	63	24	100	44
SPARSINE	1000	—	17332	100	88	97
SPARSQUR	1000	—	31	28	100	42
SSBRYBND	1000	—	20657	100	—	91

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SCHMVETT:1000	1000	—	185	41	84	100
SENSORS:1000	1000	—	111	41	57	100
SINEALI:1000	1000	—	192	65	38	100
SINQUAD:1000	1000	—	145	94	79	100
SROSENBR:1000	1000	—	278	100	77	54
TESTQUAD	1000	—	4056	100	—	29
TOINTGSS:1000	1000	—	99	70	78	100
TQUARTIC:1000	1000	—	291	100	43	53
TRIDIA:1000	1000	—	1237	100	80	57
VAREIGVL:1000	1000	—	73	78	84	100
WOODS:1000	1000	—	335	100	76	60
BRATU1D:1003	1003	1003	20170	—	—	100
NCB20	1010	—	556	100	3	51
CLPLATEA:1024	1024	32	870	80	70	100
CLPLATEB:1024	1024	32	529	86	84	100
CLPLATEC:1024	1024	32	3652	100	—	17
FMINSRF2:1024	1024	—	283	84	85	100
FMINSURF:1024	1024	—	370	90	92	100
HADAMALS:1024	1024	801	583	19	35	100
LMINSURF:1024	1024	124	662	49	74	100
NLMSURF	1024	124	4388	61	65	100
NOBNDTOR:1024	1024	235	319	75	59	100
TORSIONA:1024	1024	281	278	42	60	100
TORSIONB:1024	1024	281	278	42	60	100
TORSION111:1024	1024	323	242	42	45	100
TORSION1:1024	1024	323	242	42	45	100

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSION2:1024	1024	323	242	42	45	100
TORSIONC:1024	1024	493	153	55	57	100
TORSIOND:1024	1024	493	153	55	57	100
TORSION3:1024	1024	515	185	65	54	100
TORSION4:1024	1024	515	185	65	54	100
TORSIONE:1024	1024	761	160	88	88	100
TORSIONF:1024	1024	761	160	88	88	100
TORSION5:1024	1024	768	157	71	86	100
TORSION6:1024	1024	768	157	71	86	100
EXPQUAD:1200	1200	81	714	100	62	63
EXPLIN:1200	1200	1150	490	100	66	79
EXPLIN2:1200	1200	1181	197	61	100	53
QRTQUAD:1200	1200	50	1309	100	20	21
QUDLIN:1200	1200	1200	11	100	37	8
DIXMAANA:1500	1500	—	15	88	100	94
DIXMAANB:1500	1500	—	19	76	100	100
DIXMAANC:1500	1500	—	22	76	96	100
DIXMAAND:1500	1500	—	25	86	93	100
DIXMAANE:1500	1500	—	557	100	78	100
DIXMAANF:1500	1500	—	461	86	84	100
DIXMAANG:1500	1500	—	431	83	89	100
DIXMAANH:1500	1500	—	395	84	75	100
DIXMAANI:1500	1500	—	5665	94	62	100
DIXMAANJ:1500	1500	—	2451	73	100	95
DIXMAANK:1500	1500	—	2325	100	79	97
DIXMAANL:1500	1500	—	1010	56	46	100

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANM:1500	1500	—	5348	81	59	100
DIXMAANN:1500	1500	—	2478	70	82	100
DIXMAANO:1500	1500	—	2290	73	85	100
DIXMAANP:1500	1500	—	1963	62	67	100
CHARDIS0:2000	2000	—	4	31	100	40
EDENSCH:2000	2000	—	75	84	71	100
MODBEALE:2000	2000	—	495	100	64	25
NCB20B:2000	2000	—	1176	40	46	100
BQPGAUSS	2003	134	16618	45	44	100
JNLBRNG1:2300	2300	809	348	66	58	100
JNLBRNGA:2300	2300	847	396	68	59	100
JNLBRNGB:2300	2300	1052	1772	100	58	94
JNLBRNG2:2300	2300	1077	623	78	56	100
OBSTCLBL:2300	2300	993	299	92	90	100
OBSTCLBM:2300	2300	993	299	92	90	100
OBSTCLBU:2300	2300	993	299	92	90	100
OBSTCLAE:2300	2300	1276	176	63	70	100
OBSTCLAL:2300	2300	1276	176	63	70	100
ODC:2376	2376	206	608	89	59	100
SSC:2376	2376	206	352	100	69	93
EIGENBLS:2550	2550	—	27925	—	93	100
EIGENCLS:2652	2652	—	44261	—	—	100
DIXMAANA:3000	3000	—	15	88	100	94
DIXMAANB:3000	3000	—	19	76	100	100
DIXMAANC:3000	3000	—	22	76	96	100
DIXMAAND:3000	3000	—	25	86	93	100
DIXMAANE:3000	3000	—	715	96	66	100

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANF:3000	3000	—	592	90	100	99
DIXMAANG:3000	3000	—	517	87	86	100
DIXMAANH:3000	3000	—	508	89	91	100
DIXMAANI:3000	3000	—	3768	70	46	100
DIXMAANJ:3000	3000	—	932	20	48	100
DIXMAANK:3000	3000	—	714	49	35	100
DIXMAANL:3000	3000	—	1169	32	70	100
DIXMAANM:3000	3000	—	3679	65	52	100
DIXMAANN:3000	3000	—	3220	79	94	100
DIXMAANO:3000	3000	—	2603	79	88	100
DIXMAANP:3000	3000	—	2042	77	42	100
JNLBRNG1:3200	3200	1130	378	68	67	100
JNLBRNGA:3200	3200	1168	433	60	60	100
JNLBRNG2:3200	3200	1400	723	76	51	100
JNLBRNGB:3200	3200	1446	2217	100	63	68
OBSTCLBL:3200	3200	1252	254	85	85	100
OBSTCLBM:3200	3200	1252	254	85	85	100
OBSTCLBU:3200	3200	1252	254	85	85	100
OBSTCLAE:3200	3200	1813	228	65	73	100
OBSTCLAL:3200	3200	1813	228	65	73	100
JNLBRNG1:3400	3400	1195	446	81	77	100
JNLBRNGA:3400	3400	1233	448	67	59	100
JNLBRNG2:3400	3400	1500	689	75	62	100
JNLBRNGB:3400	3400	1545	2259	100	50	67
CHAINWOO:4000	4000	—	994	25	56	100
CHARDIS0:4000	4000	—	4	31	100	40
WOODS:4000	4000	—	355	100	47	39
HADAMALS:4096	4096	3282	795	16	11	100

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
ARWHEAD:5000	5000	—	100	57	100	69
BDQRTIC:5000	5000	—	175	100	38	23
BROYDN7D:5000	5000	—	628	56	77	100
BRYBND:5000	5000	—	64	70	77	100
BIGGSB1:5000	5000	3	37586	71	100	98
BDEXP:5000	5000	5000	3	100	100	100
CRAGGLVY:5000	5000	—	302	80	61	100
CHENHARK:5000	5000	2010	27965	100	—	53
DQDRTIC:5000	5000	—	23	92	100	40
DQRTIC:5000	5000	—	71	16	100	43
ENGVAL1:5000	5000	—	63	77	79	100
FLETBV3M:5000	5000	—	89	—	100	75
FLETGBV2:5000	5000	—	20005	100	60	82
FREUROTH:5000	5000	—	90	87	95	100
GENHUMPS:5000	5000	—	931	61	64	100
HARKERP2:5000	5000	5000	3	100	100	100
INDEFM:5000	5000	—	247	—	100	39
INDEF:5000	5000	5000	56	2	100	—
LIARWHD:5000	5000	—	141	79	100	62
MOREBV:5000	5000	—	1358	60	46	100
MCCORMCK:5000	5000	1	62	78	95	100
NCB20B:5000	5000	—	1316	100	30	99
NONCVXU2:5000	5000	—	21643	100	91	52
NONCVXUN:5000	5000	—	27482	100	—	—
NONDIA:5000	5000	—	1910	100	55	—

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
NONDQUAR:5000	5000	—	766	100	80	62
NONSCOMP:5000	5000	2500	264	81	93	100
POWELLSG:5000	5000	—	659	100	82	61
POWER:5000	5000	—	759	92	92	100
PENTDI:5000	5000	3751	28	68	100	100
QUARTC:5000	5000	—	71	16	100	43
QRTQUAD:5000	5000	549	30762	100	94	—
QUDLIN:5000	5000	5000	12	100	44	19
SCHMVETT:5000	5000	—	167	16	62	100
SINQUAD:5000	5000	—	137	51	84	100
SPARSQUR:5000	5000	—	35	35	100	37
SROSENBR:5000	5000	—	624	76	100	83
SSBRYBND:5000	5000	—	25562	93	54	100
TESTQUAD:5000	5000	—	4948	100	14	26
TOINTGSS:5000	5000	—	118	81	100	93
TQUARTIC:5000	5000	—	686	82	61	100
TRIDIA:5000	5000	—	2829	100	80	64
VAREIGVL:5000	5000	—	73	78	84	100
NCB20:5010	5010	—	633	90	14	100
CLPLATEA:5041	5041	71	2190	52	59	100
CLPLATEB:5041	5041	71	866	100	58	78
CLPLATEC:5041	5041	71	15872	100	—	—
ODC:5184	5184	284	627	83	51	100
SSC:5184	5184	284	381	100	60	81
MINSURFO:5306	5306	1762	3937	100	100	57
NOBNDTOR:5476	5476	801	662	58	52	100

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSIONA:5476	5476	1096	704	92	44	100
TORSIONB:5476	5476	1096	704	92	44	100
TORSION111:5476	5476	1219	613	56	36	100
TORSION1:5476	5476	1219	613	56	36	100
TORSION2:5476	5476	1219	613	56	36	100
TORSIONC:5476	5476	2328	422	91	95	100
TORSIOND:5476	5476	2328	422	91	95	100
TORSION3:5476	5476	2386	470	80	100	98
TORSION4:5476	5476	2386	470	80	100	98
TORSIONE:5476	5476	3782	218	64	100	59
TORSIONF:5476	5476	3782	218	64	100	59
TORSION5:5476	5476	3805	292	89	64	100
TORSION6:5476	5476	3805	292	89	64	100
FMINSRF2:5625	5625	—	525	83	82	100
FMINSURF:5625	5625	—	540	85	85	100
LMINSURF:5625	5625	296	1579	43	63	100
NLMSURF:5625	5625	296	15218	58	74	100
ODC:7344	7344	344	729	81	46	100
SSC:7344	7344	344	560	100	74	98
JNLBRNG1:7500	7500	2605	992	98	76	100
JNLBRNGA:7500	7500	2676	959	81	67	100
JNLBRNG2:7500	7500	3171	1375	76	51	100
JNLBRNGB:7500	7500	3395	3265	100	45	48
OBSTCLBL:7500	7500	2859	401	75	73	100
OBSTCLBM:7500	7500	2859	401	75	73	100
OBSTCLBU:7500	7500	2859	401	75	73	100
OBSTCLAE	7500	3819	434	60	62	100
OBSTCLAL:7500	7500	3819	434	60	62	100
DIXMAANA:9000	9000	—	15	88	100	94
DIXMAANB:9000	9000	—	19	76	100	100
DIXMAANC:9000	9000	—	22	76	96	100

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAAND:9000	9000	—	25	76	93	100
DIXMAANE:9000	9000	—	956	83	64	100
DIXMAANF:9000	9000	—	788	82	90	100
DIXMAANG:9000	9000	—	804	89	91	100
DIXMAANH:9000	9000	—	750	87	87	100
DIXMAANI:9000	9000	—	1384	34	33	100
DIXMAANJ:9000	9000	—	828	55	80	100
DIXMAANK:9000	9000	—	582	24	62	100
DIXMAANL:9000	9000	—	651	25	74	100
DIXMAANM:9000	9000	—	1680	41	28	100
DIXMAANN:9000	9000	—	1806	46	84	100
DIXMAANO:9000	9000	—	2102	49	81	100
DIXMAANP:9000	9000	—	2219	65	74	100
BOXPOWER	10000	—	27	66	100	27
BOX	10000	—	143	100	71	44
BROYDN7D:10000	10000	—	589	34	74	100
BRYBND:10000	10000	—	64	70	77	100
CHAINWOO:10000	10000	—	1083	100	43	81
CVXBQP1:10000	10000	10000	3	100	100	100
DIXON3DQ:10000	10000	—	40009	100	80	52
FLETBV3M:10000	10000	—	74	—	100	96
FLETCBV2:10000	10000	—	37579	—	75	100
FMINSRF2:10000	10000	—	684	86	83	100
FMINSURF:10000	10000	—	667	83	81	100
HARKERP2:10000	10000	10000	3	100	100	100
INDEFM:10000	10000	—	304	100	21	53

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
JNLBRNG1:10000	10000	3443	1304	89	86	100
JNLBRNGA:10000	10000	3568	1434	75	59	100
JNLBRNG2:10000	10000	4209	1812	91	51	100
JNLBRNGB:10000	10000	4484	4824	100	53	58
LIARWHD:10000	10000	—	129	100	86	70
LMINSURF:10000	10000	396	2289	50	66	100
MCCORMCK:10000	10000	1	53	66	88	100
NONCVXU2:10000	10000	—	28906	91	100	70
NONCVXUN:10000	10000	—	21612	100	—	—
NONDIA:10000	10000	—	2888	91	55	100
NONDQUAR:10000	10000	—	968	100	84	75
NLMSURF:10000	10000	396	23680	—	80	100
NOBNDTOR:10000	10000	1299	993	69	46	100
NONSCOMP:10000	10000	5000	237	76	100	81
NCVXBQP3:10000	10000	9808	196	81	69	100
NCVXBQP2:10000	10000	9934	127	42	56	100
NCVXBQP1:10000	10000	10000	5	100	18	28
OSCIGRAD:10000	10000	—	5459	—	100	—
OBSTCLBL:10000	10000	3896	480	91	64	100
OBSTCLBM:10000	10000	3896	480	91	64	100
OBSTCLBU:10000	10000	3896	480	91	64	100
OBSTCLAE:10000	10000	5061	456	64	61	100
OBSTCLAL:10000	10000	5061	456	64	61	100
POWELLSG:10000	10000	—	590	100	74	48
POWER:10000	10000	—	1012	87	86	100
QUARTC:10000	10000	—	75	16	100	43
SCHMVETT:10000	10000	—	174	14	76	100
SINQUAD:10000	10000	—	197	80	93	100
SPARSQUR:10000	10000	—	39	33	100	53

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SROSENBR:10000	10000	—	881	72	82	100
TOINTGSS:10000	10000	—	113	79	100	83
TQUARTIC:10000	10000	—	1129	94	86	100
TRIDIA:10000	10000	—	4021	100	80	53
TORSIONA:10000	10000	1839	935	83	66	100
TORSIONB:10000	10000	1839	935	83	66	100
TORSION111:10000	10000	2013	954	100	45	76
TORSION1:10000	10000	2013	954	100	45	76
TORSION2:10000	10000	2013	954	100	45	76
TORSIONC:10000	10000	4105	615	94	52	100
TORSIOND:10000	10000	4105	615	94	52	100
TORSION3:10000	10000	4189	566	82	100	84
TORSION4:10000	10000	4189	566	82	100	84
TORSIONE:10000	10000	6685	351	88	100	88
TORSIONF:10000	10000	6685	351	88	100	88
TORSION5:10000	10000	6720	334	73	100	80
TORSION6:10000	10000	6720	334	73	100	80
WOODS:10000	10000	—	540	66	59	100
JNLBRNG1:12500	12500	4277	1506	100	77	76
JNLBRNGA:12500	12500	4469	1531	77	54	100
JNLBRNG2:12500	12500	5197	2422	88	52	100
JNLBRNGB:12500	12500	5630	5603	100	40	49
OBSTCLBL:12500	12500	4623	618	96	90	100
OBSTCLBM:12500	12500	4623	618	96	90	100
OBSTCLBU:12500	12500	4623	618	96	90	100

problem	dim	nact	nf2g best	nf2g efficiency for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
OBSTCLAE:12500	12500	6481	652	96	67	100
OBSTCLAL:12500	12500	6481	652	96	67	100
ODC:14544	14544	544	1705	82	63	100
SSC:14544	14544	544	949	99	70	100
NOBNDTOR:14884	14884	1758	1413	76	35	100
TORSIONA:14884	14884	2618	1014	76	39	100
TORSIONB:14884	14884	2618	1014	76	39	100
TORSION111:14884	14884	2830	1130	77	29	100
TORSION1:14884	14884	2830	1130	77	29	100
TORSION2:14884	14884	2830	1130	77	29	100
TORSIONC:14884	14884	6034	903	99	96	100
TORSIOND:14884	14884	6034	903	99	96	100
TORSION3:14884	14884	6137	716	92	74	100
TORSION4:14884	14884	6137	716	92	74	100
TORSIONE:14884	14884	9868	411	89	100	82
TORSIONF:14884	14884	9868	411	89	100	82
TORSION5:14884	14884	9914	544	100	85	93
TORSION6:14884	14884	9914	544	100	85	93
FMINSRF2:15625	15625	—	794	90	81	100
FMINSURF:15625	15625	—	779	85	79	100
LMSURF:15625	15625	496	2854	46	63	100
NLMSURF:15625	15625	496	32574	—	61	100
BOXPOWER:20000	20000	—	30	61	100	65
MODBEALE:20000	20000	—	651	100	77	38
MCCORMCK:50000	50000	1	54	68	84	100
BOX:100000	100000	—	226	100	56	28
INDEFM:100000	100000	—	898	—	100	39
OSCIGRAD:100000	100000	—	2578	—	100	—
DEGDIAG:100001	100001	100001	3	100	100	100
DEGTRID2:100001	100001	100001	3	100	100	100

3.7 Time in milliseconds, 1e-06

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
BQP1VAR	1	1	3	10	10	1
AKIVA	2	—	70	60	10	10
BEALE	2	—	49	40	10	10
BRKMCC	2	—	27	20	1	10
CAMEL6	2	—	25	40	1	1
CLIFF	2	—	73	100	10	10
CUBE	2	—	114	100	10	20
CHEBYQAD:2	2	—	38	40	10	10
DENSCHNA	2	—	28	30	1	10
DENSCHNB	2	—	28	30	1	10
DENSCHNC	2	—	40	40	10	10
DENSCHNF	2	—	36	30	10	10
DJTL	2	—	270	160	70	—
ENGVAL1	2	—	25	30	10	10
EXPFIT	2	—	53	30	10	10
FREUROTH	2	—	43	50	1	10
HUMPS	2	—	135	120	10	20
HAIRY	2	—	58	50	20	10
HIMMELBB	2	—	22	30	10	10
HIMMELBG	2	—	35	30	1	10
HIMMELBH	2	—	22	30	10	10
HS1	2	—	104	70	20	20
HS5	2	—	26	40	10	10
HILBERTA:2	2	—	11	20	1	10
HIMMELP1	2	1	22	30	1	10
HS2	2	1	32	20	1	10
HS3MOD	2	1	4	40	1	10
HS3	2	1	4	20	1	1
HS4	2	2	3	10	1	10
JENSMP	2	—	152	150	10	—
LOGHAIRY	2	—	74	50	10	20

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
LOGROS	2	—	182	210	10	20
MARATOSB	2	—	3169	1160	480	500
MEXHAT	2	—	330	230	40	40
MODBEALE	2	—	49	40	10	10
MDHOLE	2	1	9	20	10	10
OSCIGRAD:2	2	—	5382	1460	—	820
OSCIPATH:2	2	—	202	130	30	30
ROSENBR	2	—	103	60	10	20
S308	2	—	28	20	10	10
SINEVAL	2	—	47	20	1	10
SISSER	2	—	35	40	1	10
SNAIL	2	—	25	30	1	10
SENSORS:2	2	—	31	20	1	10
SIMBQP	2	1	4	20	10	10
SIM2BQP	2	2	3	1	1	1
ZANGWIL2	2	—	11	20	10	10
BARD	3	—	174	150	10	50
BOX3	3	—	23	30	10	10
BOX2	3	1	113	90	10	30
DENSCHND	3	—	64	30	10	10
DENSCHNE	3	—	27	30	1	10
ENGVAL2	3	—	107	80	10	20
EG1	3	1	81	70	10	10
GROWTHLS	3	—	94	80	20	20
GULF	3	—	4	30	1	40
HATFLDD	3	—	71	80	10	20
HATFLDE	3	—	74	50	10	10
HATFLDFL	3	—	405	660	50	60
HELIX	3	—	43	30	10	20
HIELOW	3	—	74	200	40	50
HS25	3	—	8	20	10	70
KOEBHELB	3	—	195	150	20	—

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
MEYER3	3	—	876	380	170	—
PFIT1LS	3	—	52	30	—	—
PFIT2LS	3	—	52	30	—	—
PFIT3LS	3	—	52	30	—	—
PFIT4LS	3	—	52	40	—	—
SCHMVETT	3	—	54	50	1	10
SENSORS:3	3	—	97	80	10	20
SPECAN:3	3	3	3	10	1	1
WEEDS	3	1	72	60	20	10
YFIT	3	—	225	270	20	60
YFITU	3	—	364	200	40	80
ALLINITU	4	—	31	30	20	10
ALLINIT	4	2	41	40	1	10
BROWNDEN	4	—	72	50	1	20
CRAGGLVY	4	—	134	120	20	20
CHAINWOO:4	4	—	98	60	10	10
CHEBYQAD:4	4	—	48	110	1	10
HATFLDA	4	—	67	130	10	10
HIMMELBF	4	—	293	190	20	70
HS38	4	—	102	70	10	10
HILBERTA:4	4	—	19	30	10	10
HATFLDB	4	1	109	100	10	20
HADAMALS	4	3	37	20	10	10
KOWOSB	4	—	188	100	20	50
MSQRTALS	4	—	63	50	10	1
MODBEALE:4	4	—	76	40	10	20
PENALTY2	4	—	1538	860	100	270
POWELLSG	4	—	120	80	10	20
PALMER1B	4	—	29	30	30	40
PALMER2B	4	—	31	30	30	40
PALMER3B	4	—	26	30	60	10
PALMER4B	4	—	31	30	20	20

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
PALMER5D	4	—	21	20	10	10
PENALTY1:4	4	—	391	340	30	70
PSPDOC	4	1	25	30	20	1
PALMER1	4	1	116	80	20	20
PALMER2	4	1	79	60	1	20
PALMER3	4	1	77	80	10	30
PALMER4	4	1	91	100	10	20
POWELLBC:4	4	4	4	20	1	10
SINEALI:4	4	—	270	150	20	30
WOODS:4	4	—	102	80	20	10
CHEBYQAD:5	5	2	61	60	10	10
EXTROSNB	5	—	322	310	20	50
GENHUMPS:5	5	—	254	200	30	40
GENROSE:5	5	—	137	110	10	20
HILBERTB	5	—	19	20	10	10
HILBERTA:5	5	—	23	30	1	20
HS45	5	5	3	1	1	1
OSBORNEA	5	5	28	30	—	—
OSCIGRAD:5	5	—	5142	1370	360	—
SINQUAD	5	—	50	60	10	1
TQUARTIC	5	—	54	40	10	10
BIGGS6	6	—	494	1910	40	360
BIGGS5	6	1	216	240	20	30
BIGGS3	6	3	76	70	10	10
CHEBYQAD:6	6	2	62	80	10	20
EIGENALS:6	6	—	109	70	10	20
EIGENBLS:6	6	—	101	80	10	20
HEART6LS	6	—	3316	1440	220	570
HILBERTA:6	6	—	23	30	10	20
HART6	6	2	59	40	10	10
PALMER6A	6	—	33	30	120	300

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
PALMER7A	6	—	37	30	—	—
PALMER8A	6	—	33	20	50	50
PALMER1A	6	—	45	40	70	240
PALMER2A	6	—	45	40	60	220
PALMER3A	6	—	33	30	80	160
PALMER4A	6	—	33	20	50	120
PALMER5C	6	—	27	30	1	10
SPECAN:6	6	6	3	1	10	1
CHEBYQAD:7	7	1	107	150	10	40
PALMER1D	7	—	33	30	20	—
AIRCRFTB	8	3	250	250	40	30
CHEBYQAD:8	8	2	96	200	10	30
HEART8LS	8	—	688	870	350	150
MAXLIKA	8	7	8	10	10	10
OSLBQP	8	7	4	20	1	1
PALMER6C	8	—	37	20	10	—
PALMER6E	8	—	70	460	10	990
PALMER7C	8	—	37	30	10	—
PALMER8C	8	—	37	30	10	—
PALMER8E	8	—	84	350	10	1100
PALMER1C	8	—	37	30	10	—
PALMER1E	8	—	1295	750	90	—
PALMER2C	8	—	37	20	10	—
PALMER3C	8	—	37	30	1	—
PALMER4C	8	—	37	30	1	—
PALMER4E	8	—	1045	400	220	—
PALMER5A	8	—	41	30	—	—
POWELLSG:8	8	—	203	170	10	40
PALMER7E	8	1	9017	2290	—	—
PALMER2E	8	1	2136	650	—	—
PALMER3E	8	1	2093	650	—	—

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
S368:8	8	6	34	30	10	20
VIBRBEAM	8	—	2753	910	—	—
CHEBYQAD:9	9	2	98	190	10	60
MSQRTBLS	9	—	100	70	20	10
NONMSQRT	9	—	833	1390	60	—
SPECAN:9	9	9	3	10	10	10
ARGLINA:10	10	—	7	40	1	1
ARGLINB:10	10	—	7	20	1	10
ARGLINC:10	10	—	7	10	1	10
BROWNAL	10	—	75	50	10	10
BRYBND	10	—	269	330	20	40
BOXPOWER:10	10	—	21	20	10	1
BOX:10	10	—	41	30	1	10
BROYDN7D:10	10	—	94	100	10	10
CHNROSNB	10	—	217	180	20	30
CHNRSNBM	10	—	231	200	20	30
CHARDIS0:10	10	—	4	20	1	1
COSINE:10	10	—	102	70	10	30
CRAGGLVY:10	10	—	133	90	10	10
CHEBYQAD	10	2	63	200	1	30
CHENHARK:10	10	3	61	40	10	10
CVXBQP1:10	10	10	3	1	1	1
DIXON3DQ	10	—	45	50	10	10
DQDRTIC	10	—	23	20	10	10
DQRTIC:10	10	—	83	70	10	10
ERRINROS:10	10	—	370	280	30	80
ERRINRSM:10	10	—	777	400	50	240
EXTROSNB:10	10	—	3234	1690	210	620
FLETBV3M	10	—	37	60	10	20
FLETBV2	10	—	47	30	10	10
FLETBV3	10	—	67	110	10	10

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
FLETCHBV	10	—	112	120	20	20
FLETCHCR	10	—	229	210	20	30
FREUROTH:10	10	—	74	40	10	10
GENHUMPS:10	10	—	480	400	90	120
GENROSE:10	10	—	232	210	30	40
HS110	10	—	35	50	1	—
HILBERTA:10	10	—	23	20	1	20
HILBERTB:10	10	—	19	20	10	10
HARKERP2:10	10	10	3	10	1	1
INDEFM:10	10	—	126	80	10	20
INDEF:10	10	10	53	210	20	10
MOREBV	10	—	71	50	10	20
MANCINO:10	10	—	26	20	1	10
MODBEALE:10	10	—	146	70	20	160
MCCORMCK	10	1	54	60	10	10
NONCVXU2:10	10	—	75	60	10	10
NONCVXUN:10	10	—	71	50	1	20
NONDIA:10	10	—	106	80	10	10
NCVXBQP1:10	10	10	8	20	1	10
NCVXBQP2:10	10	10	5	10	10	10
NCVXBQP3:10	10	10	8	20	10	10
POWER	10	—	67	60	10	10
PENALTY1:10	10	—	313	200	40	50
PENALTY2:10	10	—	1469	620	120	260
PROBPENL:10	10	4	827	410	60	760
POWELLBC:10	10	7	17	50	10	1
RAYBENDL:10	10	4	90	70	10	20
RAYBENDS:10	10	4	154	140	20	20
SINEALI	10	—	3666	1730	240	650
SROSENBR	10	—	169	110	20	50

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SCHMVETT:10	10	—	90	60	10	10
SENSORS:10	10	—	60	40	10	10
SPARSINE:10	10	—	53	30	10	20
SPARSQUR:10	10	—	34	40	20	10
SSBRYBND:10	10	—	737	390	60	1430
SSCOSINE:10	10	—	372	210	30	—
TOINTGSS	10	—	108	60	20	20
TQUARTIC:10	10	—	82	70	20	10
TRIDIA:10	10	—	45	30	10	20
VARDIM	10	—	67	70	1	20
VAREIGVL:10	10	—	46	50	1	1
OSBORNEB	11	—	3847	—	—	730
EXPQUAD:12	12	4	118	110	10	30
QRTQUAD:12	12	3	223	100	10	130
QUDLIN	12	12	8	10	10	10
WATSON:12	12	—	238	170	20	60
BRATU1D:13	13	2	65	50	1	20
DIXMAANA	15	—	19	20	1	10
DIXMAANB	15	—	19	30	10	1
DIXMAANC	15	—	19	30	1	1
DIXMAAND	15	—	25	20	1	1
DIXMAANE	15	—	61	40	10	10
DIXMAANF	15	—	61	40	1	10
DIXMAANG	15	—	64	20	10	10
DIXMAANH	15	—	61	40	10	10
DIXMAANI	15	—	113	60	10	20
DIXMAANJ	15	—	124	80	20	20

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANK	15	—	133	110	20	10
DIXMAANL	15	—	113	80	20	20
DIXMAANM	15	—	93	50	20	20
DIXMAANN	15	—	113	80	10	30
DIXMAANO	15	—	115	60	10	10
DIXMAANP	15	—	131	70	10	20
PARKCH	15	—	693	5970	—	33090
CLPLATEA:16	16	4	81	80	10	10
CLPLATEB:16	16	4	83	60	10	1
CLPLATEC:16	16	4	69	40	10	20
FMINSURF	16	—	64	50	10	10
FMINSRF2:16	16	—	82	50	10	10
HADAMALS:16	16	8	109	90	10	30
LMINSURF	16	12	41	30	10	1
NLMSURF:16	16	12	49	40	10	10
NOBNDTOR:16	16	13	36	30	10	10
POWELLSG:16	16	—	366	200	40	110
TORSION111:16	16	14	22	30	10	10
TORSION1:16	16	14	22	20	10	10
TORSION2:16	16	14	22	30	1	10
TORSIONA:16	16	14	22	30	10	1
TORSIONB:16	16	14	22	20	10	1
TORSIONC:16	16	14	22	30	10	1
TORSIOND:16	16	14	22	30	20	10
TORSION3:16	16	16	7	20	1	20
TORSION4:16	16	16	7	20	1	10
TORSION5:16	16	16	4	20	1	1
TORSION6:16	16	16	4	20	1	1
TORSIONE:16	16	16	4	10	1	1
TORSIONF:16	16	16	4	20	1	10
CHARDIS0:18	18	—	4	10	10	1

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
LINVERSE	19	8	240	450	10	150
CHEBYQAD:20	20	3	127	150	20	40
MANCINO:20	20	—	31	30	1	10
NONDIA:20	20	—	147	120	10	20
POWELLSG:20	20	—	390	230	50	170
POWER:20	20	—	79	100	10	10
POWELLBC:20	20	13	107	70	10	40
TRIDIA:20	20	—	85	40	10	20
NCB20B	21	—	190	120	40	40
NCB20B:22	22	—	254	140	50	110
RAYBENDL:24	24	4	1152	740	—	220
RAYBENDS:24	24	4	3570	2680	—	660
BIGGSB1	25	3	221	140	20	60
CHNROSNB:25	25	—	383	350	60	50
CHNRSNBM:25	25	—	632	360	70	140
ERRINROS:25	25	—	452	350	—	80
ERRINRSM:25	25	—	1254	460	—	520
HATFLDC	25	12	49	50	10	10
NONSCOMP	25	12	333	210	20	70
OSCIPATH:25	25	—	182	120	10	30
QUARTC	25	—	39	80	1	1
SPMSRTLS	28	—	175	150	20	20
X3PK	30	1	4414	2620	—	—
EIGENCLS:30	30	—	520	290	50	80
MANCINO:30	30	—	32	40	10	1
NONDIA:30	30	—	184	110	10	30
POWER:30	30	—	79	80	20	10
TRIDIA	30	—	129	80	20	30
WATSON:31	31	—	1408	500	430	—

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
EDENSCH	36	—	70	60	10	10
HADAMALS:36	36	24	192	170	20	100
LIARWHD	36	—	73	80	10	10
POWELLSG:36	36	—	421	230	50	180
CHARDIS0:40	40	—	4	20	1	1
POWELLSG:40	40	—	414	240	50	180
QR3DLS:40	40	1	4330	1300	—	1000
RAYBENDL	44	4	8754	—	—	1360
CLPLATEA	49	7	143	110	10	20
CLPLATEB	49	7	137	120	20	20
CLPLATEC	49	7	288	150	30	60
FMINSRF2:49	49	—	142	80	20	20
FMINSURF:49	49	—	112	80	10	10
LMINSURF:49	49	24	96	70	20	10
MSQRTALS:49	49	—	733	400	—	140
MSQRTBLS:49	49	—	584	320	70	120
NLMSURF:49	49	24	381	280	40	60
ARGLINA:50	50	—	7	20	10	10
ARGLINB:50	50	—	7	30	1	10
ARGLINC:50	50	—	7	30	1	10
BROYDN7D:50	50	—	290	260	40	30
BRYBND:50	50	—	67	50	10	10
BQPGABIM	50	26	119	80	10	30
BQPGASIM	50	27	108	70	20	40
CHNROSNB:50	50	—	730	440	90	150
CHNRSNBM:50	50	—	1013	520	90	180
CRAGGLVY:50	50	—	256	190	40	30
CHEBYQAD:50	50	6	196	530	360	120
CVXBQP1:50	50	50	3	10	1	1
DQDRTIC:50	50	—	23	20	1	30
DQRTIC:50	50	—	43	80	10	10

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
ENGVAL1:50	50	—	60	60	1	10
ERRINROS:50	50	—	445	360	—	80
ERRINRSM:50	50	—	1455	510	700	560
FREUROTH:50	50	—	78	50	10	10
HILBERTB:50	50	—	19	40	1	10
INDEFM:50	50	—	202	410	20	40
INDEF:50	50	50	56	190	1	80
MANCINO:50	50	—	37	190	10	20
MOREBV:50	50	—	1539	1760	110	710
MCCORMCK:50	50	1	56	40	10	20
NCB20B:50	50	—	1024	390	310	370
NONDIA:50	50	—	145	90	10	40
NONSCOMP:50	50	25	266	200	20	50
NCVXBQP3:50	50	49	34	30	1	20
NCVXBQP1:50	50	50	5	10	10	10
NCVXBQP2:50	50	50	22	20	10	10
PENALTY3	50	—	1179	1000	230	370
PENALTY1:50	50	—	234	280	30	30
PENALTY2:50	50	—	482	260	60	70
POWER:50	50	—	91	90	10	10
PROBPENL:50	50	—	8204	2270	—	—
PENTDI:50	50	37	28	30	10	1
SINQUAD:50	50	—	104	100	20	30
SPARSINE:50	50	—	469	270	60	70
SPARSQUR:50	50	—	24	60	1	10
SROSENBR:50	50	—	205	170	20	90
SSBRYBND:50	50	—	5532	1580	—	—
S368:50	50	32	9	60	10	1
TOINTGOR	50	—	396	270	40	60
TOINTPSP	50	—	284	180	60	50

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TOINTQOR	50	—	113	60	10	20
TOINTGSS:50	50	—	135	80	20	10
TQUARTIC:50	50	—	110	70	20	30
TRIDIA:50	50	—	217	120	20	30
VAREIGVL	50	—	64	70	1	10
VARDIM:50	50	—	101	110	20	20
CHARDIS0:60	60	—	4	20	1	1
POWELLSG:60	60	—	432	250	50	200
DECONVU	61	10	3206	1030	670	1130
DECONVB	61	41	483	480	40	—
FMINSRF2	64	—	184	130	20	20
FMINSURF:64	64	—	150	100	10	30
HADAMALS:64	64	34	177	200	10	60
LMINSURF:64	64	28	127	120	10	10
MINSURF	64	28	85	90	10	10
NLMSURF:64	64	28	482	340	40	70
POWER:75	75	—	109	80	20	10
BRATU1D	77	2	1035	470	100	160
POWELLSG:80	80	—	568	290	60	190
DIXMAANA:90	90	—	15	20	1	10
DIXMAANB:90	90	—	19	20	10	1
DIXMAANC:90	90	—	22	20	1	10
DIXMAAND:90	90	—	25	30	1	10
DIXMAANE:90	90	—	158	90	20	30
DIXMAANF:90	90	—	172	100	20	20
DIXMAANG:90	90	—	144	100	30	20
DIXMAANH:90	90	—	172	110	20	30
DIXMAANI:90	90	—	529	290	40	140

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANJ:90	90	—	600	290	60	80
DIXMAANK:90	90	—	653	340	50	150
DIXMAANL:90	90	—	588	310	40	150
DIXMAANM:90	90	—	501	290	40	140
DIXMAANN:90	90	—	720	340	80	80
DIXMAANO:90	90	—	853	390	80	190
DIXMAANP:90	90	—	690	370	90	140
NONDIA:90	90	—	177	110	30	80
ARGLINA:100	100	—	7	20	1	1
ARGLINB:100	100	—	13	20	10	10
ARGLINC:100	100	—	52	60	20	10
ARWHEAD:100	100	—	57	40	10	10
BDQRTIC	100	—	133	100	30	20
BOXPOWER:100	100	—	27	40	10	10
BOX:100	100	—	83	60	10	10
BROWNAL:100	100	—	74	50	10	40
BROYDN7D:100	100	—	415	340	60	40
BRYBND:100	100	—	64	60	10	10
BDEXP	100	2	315	2120	30	—
BIGGSB1:100	100	3	904	580	110	190
CHARDIS0	100	—	4	20	1	1
CHAINWOO:100	100	—	1049	720	80	240
COSINE:100	100	—	946	440	190	—
CRAGGLVY:100	100	—	257	250	40	30
CURLY10:100	100	—	3726	1650	290	460
CURLY20:100	100	—	3064	980	550	530
CURLY30:100	100	—	2324	750	610	540
CHEBYQAD:100	100	4	293	1190	4800	360
CLPLATEA:100	100	10	203	160	30	30
CLPLATEB:100	100	10	208	150	20	20
CLPLATEC:100	100	10	705	380	50	190

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
CHENHARK:100	100	30	5420	2020	330	940
CVXBP1	100	100	3	1	1	20
DIXON3DQ:100	100	—	405	220	30	220
DQDRTIC:100	100	—	23	30	10	10
DQRTIC:100	100	—	51	110	10	20
ENGVAL1:100	100	—	61	50	10	20
EXTROSNB:100	100	—	4860	3630	690	1050
FLETBV3M:100	100	—	89	100	10	20
FLETGBV2:100	100	—	660	330	70	170
FLETGBV3:100	100	—	469	1310	760	170
FLETCHCR:100	100	—	1782	890	190	360
FREUROTH:100	100	—	74	50	10	20
GENHUMPS:100	100	—	1024	560	150	220
GENROSE:100	100	—	1756	880	180	340
HADAMALS:100	100	76	372	330	90	100
HARKERP2	100	100	3	1	10	10
INDEFM:100	100	—	262	290	80	60
INDEF:100	100	100	51	120	1	90
LIARWHD:100	100	—	74	50	10	10
MANCINO:100	100	—	42	300	50	120
MOREBV:100	100	—	9288	2550	—	1440
MSQRTALS:100	100	—	1276	860	290	230
MSQRTBLS:100	100	—	2164	980	330	340
MCCORMCK:100	100	1	56	60	1	10
NONDQUAR	100	—	514	290	80	240
NCB20B:100	100	—	1948	720	830	500
NONCVXU2:100	100	—	1483	650	120	240
NONCVXUN:100	100	—	567	340	40	140
NONDIA:100	100	—	369	220	50	80

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
NOBNDTOR:100	100	49	155	130	10	30
NONSCOMP:100	100	50	240	180	20	40
NCVXBQP3:100	100	98	43	30	10	30
NCVXBQP1:100	100	100	5	20	1	10
NCVXBQP2:100	100	100	21	20	1	20
OSCIPTH:100	100	—	228	190	20	50
PENALTY1:100	100	—	217	260	20	40
PENALTY2:100	100	—	265	240	40	30
PENALTY3:100	100	—	2686	3860	1090	1360
POWELLSG:100	100	—	530	290	50	190
POWER:100	100	—	112	110	20	10
PROBPENL:100	100	—	43	40	—	—
PENTDI:100	100	74	30	30	1	10
QUARTC:100	100	—	51	140	20	20
SCHMVETT:100	100	—	156	150	20	30
SENSORS:100	100	—	85	390	150	180
SINEALI:100	100	—	219	690	50	30
SINQUAD:100	100	—	97	80	20	20
SPARSINE:100	100	—	829	370	90	190
SPARSQUR:100	100	—	27	70	1	10
SPMSRTLS:100	100	—	1449	—	100	—
SROSENBR:100	100	—	183	150	20	140
SSBRYBND:100	100	—	10936	3010	—	—
S368:100	100	73	10	100	30	10
TOINTGSS:100	100	—	103	80	20	10
TQUARTIC:100	100	—	218	150	20	30
TRIDIA:100	100	—	341	190	20	70

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSIONA:100	100	54	118	120	20	30
TORSIONB:100	100	54	118	110	10	30
TORSION111:100	100	58	102	110	20	10
TORSION1:100	100	58	102	100	10	20
TORSION2:100	100	58	102	110	10	20
TORSIONC:100	100	67	82	60	10	20
TORSIOND:100	100	67	82	100	10	30
TORSION3:100	100	71	78	60	20	20
TORSION4:100	100	71	78	60	10	30
TORSIONE:100	100	84	50	70	10	20
TORSIONF:100	100	84	50	60	10	20
TORSION5:100	100	86	46	60	10	10
TORSION6:100	100	86	46	50	10	10
VARDIM:100	100	—	122	130	10	20
VAREIGVL:100	100	—	73	80	10	10
WOODS:100	100	—	237	160	30	130
EXPLIN:101	101	95	166	160	20	100
EXPLIN2:101	101	101	5	10	10	1
BRATU1D:103	103	2	1084	590	150	180
EIGENALS	110	—	4266	1750	420	630
EIGENBLS	110	—	2141	1050	190	320
NCB20:110	110	—	1162	510	—	450
EXPQUAD	120	7	214	130	20	40
EXPLIN	120	70	543	300	70	170
EXPLIN2	120	101	215	200	30	120
QRTQUAD	120	5	269	100	40	170
QUDLIN:120	120	120	8	40	10	20
FMINSRF2:121	121	—	214	140	20	30
FMINSURF:121	121	—	176	180	20	40
LMINSURF:121	121	40	170	190	10	20
NLMSURF:121	121	40	946	630	90	170

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
HADAMALS:144	144	79	287	350	40	60
HOLMES	180	180	3	1	1	1
NCB20B:180	180	—	1298	900	320	280
DRCV2LQ	196	96	4966	1670	350	700
DRCV3LQ	196	96	9829	3330	710	1550
HADAMALS:196	196	161	468	410	60	150
ARGLINA:200	200	—	7	50	10	1
ARGLINB:200	200	—	28	80	1	10
ARGLINC:200	200	—	23	60	10	10
BROWNAL:200	200	—	75	90	20	130
CHARDIS0:200	200	—	4	50	1	10
MODBEALE:200	200	—	409	280	70	380
PENALTY2:200	200	—	550	—	70	70
PENALTY3:200	200	—	6757	22730	8280	—
POWELLBC:200	200	104	2638	1260	1610	1130
VARDIM:200	200	—	120	150	20	20
HADAMALS:256	256	135	502	420	70	190
ODC:288	288	148	606	480	130	100
SSC:288	288	148	390	290	40	70
DIXMAANA:300	300	—	15	40	1	1
DIXMAANB:300	300	—	19	30	10	1
DIXMAANC:300	300	—	22	40	10	1
DIXMAAND:300	300	—	25	40	10	1
DIXMAANE:300	300	—	277	200	30	60
DIXMAANF:300	300	—	236	230	40	30

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANG:300	300	—	239	130	20	30
DIXMAANH:300	300	—	233	200	40	30
DIXMAANI:300	300	—	1781	700	190	360
DIXMAANJ:300	300	—	1452	620	150	270
DIXMAANK:300	300	—	1397	660	140	220
DIXMAANL:300	300	—	1248	620	120	220
DIXMAANM:300	300	—	1761	700	220	340
DIXMAANN:300	300	—	1904	760	160	320
DIXMAANO:300	300	—	1952	780	170	330
DIXMAANP:300	300	—	1868	700	160	390
HADAMALS:324	324	256	499	580	70	170
CHARDIS0:400	400	—	4	40	10	10
HADAMALS:400	400	306	545	820	170	440
JNLBRNG1:400	400	253	274	180	40	130
JNLBRNGA:400	400	253	317	350	40	170
JNLBRNG2:400	400	278	295	270	30	160
JNLBRNGB:400	400	302	399	220	30	210
OBSTCLBL:400	400	263	28	80	10	50
OBSTCLBM:400	400	263	28	70	10	50
OBSTCLBU:400	400	263	28	80	10	50
OBSTCLAE:400	400	398	9	50	10	10
OBSTCLAL:400	400	398	9	20	10	1
EIGENCLS	462	—	7080	4630	2540	6930
NOBNDTOR:484	484	143	192	340	40	120
TORSIONA:484	484	161	202	350	40	220
TORSIONB:484	484	161	202	350	40	220
TORSION111:484	484	186	184	330	50	190
TORSION1:484	484	186	184	330	50	180
TORSION2:484	484	186	184	340	40	180
TORSIONC:484	484	254	154	210	30	140
TORSIOND:484	484	254	154	260	30	140
TORSION3:484	484	267	193	220	40	180

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSION4:484	484	267	193	180	30	210
TORSIONE:484	484	362	107	130	30	90
TORSIONF:484	484	362	107	170	20	80
TORSION5:484	484	368	116	150	20	90
TORSION6:484	484	368	116	130	30	90
ARWHEAD:500	500	—	68	80	20	40
BDQRTIC:500	500	—	148	180	40	110
BROYDN7D:500	500	—	538	640	100	410
BRYBND:500	500	—	64	60	10	20
BDEXP:500	500	2	1514	—	190	—
CRAGGLVY:500	500	—	290	390	40	170
DQRTIC	500	—	59	240	10	50
DQDRTIC:500	500	—	23	30	10	10
FREUROTH:500	500	—	96	220	20	100
GENHUMPS:500	500	—	953	1160	180	680
GENROSE:500	500	—	8466	7310	800	6480
HARKERP2:500	500	500	3	10	10	1
LIARWHD:500	500	—	99	80	20	40
MOREBV:500	500	—	1489	680	190	800
MCCORMCK:500	500	1	56	150	10	40
NCB20B:500	500	—	1055	760	580	1300
NONDIA:500	500	—	663	560	100	710
NONDQUAR:500	500	—	569	410	90	680
NONSCOMP:500	500	250	266	380	30	180
OSCIPATH:500	500	—	211	170	20	120
PENALTY1:500	500	—	169	220	20	90
POWELLSG:500	500	—	645	440	70	690
POWER:500	500	—	255	160	30	130
PROBPENL:500	500	—	7	20	1	1
PENTDI:500	500	376	28	30	1	10

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
QUARTC:500	500	—	59	320	10	50
SCHMVETT:500	500	—	159	1030	40	80
SINQUAD:500	500	—	155	210	20	110
SROSENBR:500	500	—	270	240	20	320
TOINTGSS:500	500	—	109	100	10	50
TQUARTIC:500	500	—	481	420	40	420
TRIDIA:500	500	—	857	420	80	1040
VAREIGVL:500	500	—	73	120	10	30
BRATU1D:503	503	2	6081	—	1340	3820
CLPLATEA:529	529	23	552	430	80	360
CLPLATEB:529	529	23	428	360	60	290
CLPLATEC:529	529	23	1972	850	—	6930
ODC	864	164	576	1490	160	480
SSC	864	164	397	1080	90	340
FMINSRF2:961	961	—	271	1010	40	210
FMINSURF:961	961	—	331	630	60	280
LMINSURF:961	961	120	607	2210	120	430
NLMSURF:961	961	120	4301	12450	800	2980
ARWHEAD:1000	1000	—	64	160	10	60
BDQRTIC:1000	1000	—	171	410	70	240
BOXPOWER:1000	1000	—	42	100	10	50
BOX:1000	1000	—	141	380	20	130
BROWNAL:1000	1000	—	107	660	210	630

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
BROYDN7D:1000	1000	—	526	2190	180	510
BRYBND:1000	1000	—	64	190	10	40
BDEXP:1000	1000	2	3017	—	490	—
BIGGSB1:1000	1000	3	7917	15410	1160	5520
CHAINWOO	1000	—	903	1490	150	960
CURLY10	1000	—	25995	—	2690	16070
CHARDIS0:1000	1000	—	4	180	20	70
CRAGGLVY:1000	1000	—	271	740	70	340
CVXBQP1:1000	1000	1000	3	1	1	1
DIXON3DQ:1000	1000	—	4005	5770	380	6910
DQDRTIC:1000	1000	—	23	70	1	20
DQRTIC:1000	1000	—	63	400	10	70
EG2	1000	—	428	790	80	590
ENGVAL1:1000	1000	—	66	200	10	30
EXTROSNB:1000	1000	—	4970	22830	1050	4740
FLETBV3M:1000	1000	—	52	350	10	80
FLETGBV2:1000	1000	—	4009	6980	1010	5110
FLETGBV3:1000	1000	—	14177	—	—	18100
FLETCHCR:1000	1000	—	16834	42270	1900	14500
FREUROTH:1000	1000	—	76	180	20	50
GENHUMPS	1000	—	1097	2270	220	970
HARKERP2:1000	1000	1000	3	10	10	1
INDEFM	1000	—	558	—	120	620
INDEF	1000	1000	53	390	10	430
JNLBRNG1:1000	1000	366	278	730	70	210
JNLBRNGA:1000	1000	385	329	1050	70	250
JNLBRNG2:1000	1000	524	505	1320	140	440

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
JNLBRNGB:1000	1000	560	1347	2390	230	1030
LIARWHD:1000	1000	—	108	200	10	130
MOREBV:1000	1000	—	1468	3480	260	880
MCCORMCK:1000	1000	1	59	170	10	40
NONCVXU2	1000	—	5407	9530	840	6160
NONCVXUN	1000	—	10021	28930	1420	—
NONDIA	1000	—	1340	2510	220	1080
NCB20B:1000	1000	—	1244	3010	1020	1980
NONDQUAR:1000	1000	—	618	930	80	700
NONSCOMP:1000	1000	500	274	510	40	270
NCVXBQP3	1000	983	93	150	20	120
NCVXBQP2	1000	993	80	170	20	130
NCVXBQP1	1000	1000	5	20	10	1
OSCIGRAD:1000	1000	—	1486	—	160	—
OBSTCLBL	1000	680	170	460	20	240
OBSTCLBM	1000	680	170	460	30	240
OBSTCLBU	1000	680	170	440	20	210
OBSTCLAL	1000	696	72	320	20	90
OBSTCLAE:1000	1000	696	72	330	10	90
PENALTY1:1000	1000	—	151	580	20	100
POWELLSG:1000	1000	—	575	960	100	990
POWER:1000	1000	—	348	710	40	220
POWELLBC:1000	1000	501	10829	—	—	44560
PENTDI	1000	751	25	90	1	10
QUARTC:1000	1000	—	63	420	1	70
SPARSINE	1000	—	17332	28910	2140	13120
SPARSQUR	1000	—	31	220	10	30
SSBRYBND	1000	—	20657	34850	—	17490

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SCHMVETT:1000	1000	—	185	940	60	260
SENSORS:1000	1000	—	111	44350	27590	15110
SINEALI:1000	1000	—	192	600	80	120
SINQUAD:1000	1000	—	145	330	30	80
SROSENBR:1000	1000	—	278	560	40	440
TESTQUAD	1000	—	4056	5720	—	8090
TOINTGSS:1000	1000	—	99	310	30	60
TQUARTIC:1000	1000	—	291	520	70	530
TRIDIA:1000	1000	—	1237	1930	130	1310
VAREIGVL:1000	1000	—	73	230	10	50
WOODS:1000	1000	—	335	590	50	410
BRATU1D:1003	1003	1003	20170	—	—	16650
NCB20	1010	—	556	1420	5350	1440
CLPLATEA:1024	1024	32	870	2030	160	710
CLPLATEB:1024	1024	32	529	1200	100	460
CLPLATEC:1024	1024	32	3652	6470	—	16330
FMINSRF2:1024	1024	—	283	700	50	280
FMINSURF:1024	1024	—	370	750	50	320
HADAMALS:1024	1024	801	583	5810	670	1000
LMINSURF:1024	1024	124	662	2250	120	520
NLMSURF	1024	124	4388	12210	880	3270
NOBNDTOR:1024	1024	235	319	850	90	420
TORSIONA:1024	1024	281	278	1420	90	340
TORSIONB:1024	1024	281	278	1320	90	340
TORSION111:1024	1024	323	242	1090	90	330
TORSION1:1024	1024	323	242	1120	100	310

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSION2:1024	1024	323	242	1080	100	290
TORSIONC:1024	1024	493	153	680	50	160
TORSIOND:1024	1024	493	153	630	50	170
TORSION3:1024	1024	515	185	630	60	250
TORSION4:1024	1024	515	185	660	60	250
TORSIONE:1024	1024	761	160	410	40	180
TORSIONF:1024	1024	761	160	410	40	200
TORSION5:1024	1024	768	157	600	40	220
TORSION6:1024	1024	768	157	460	40	180
EXPQUAD:1200	1200	81	714	1200	130	1130
EXPLIN:1200	1200	1150	490	800	70	610
EXPLIN2:1200	1200	1181	197	500	20	370
QRTQUAD:1200	1200	50	1309	2120	660	5190
QUDLIN:1200	1200	1200	11	20	10	50
DIXMAANA:1500	1500	—	15	50	10	10
DIXMAANB:1500	1500	—	19	70	10	10
DIXMAANC:1500	1500	—	22	80	1	10
DIXMAAND:1500	1500	—	25	100	1	1
DIXMAANE:1500	1500	—	557	1060	80	420
DIXMAANF:1500	1500	—	461	1110	80	430
DIXMAANG:1500	1500	—	431	1070	70	400
DIXMAANH:1500	1500	—	395	930	80	350
DIXMAANI:1500	1500	—	5665	10460	920	4060
DIXMAANJ:1500	1500	—	2451	5840	320	2250
DIXMAANK:1500	1500	—	2325	4090	420	2000
DIXMAANL:1500	1500	—	1010	3200	310	810

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANM:1500	1500	—	5348	11480	950	4610
DIXMAANN:1500	1500	—	2478	6200	430	1790
DIXMAANO:1500	1500	—	2290	5500	380	1810
DIXMAANP:1500	1500	—	1963	5600	420	1460
CHARDIS0:2000	2000	—	4	510	50	140
EDENSCH:2000	2000	—	75	210	20	60
MODBEALE:2000	2000	—	495	1420	210	2730
NCB20B:2000	2000	—	1176	10410	1520	2370
BQPGAUSS	2003	134	16618	71790	6900	17580
JNLBRNG1:2300	2300	809	348	1380	180	550
JNLBRNGA:2300	2300	847	396	1520	160	550
JNLBRNGB:2300	2300	1052	1772	4480	690	2050
JNLBRNG2:2300	2300	1077	623	2180	270	780
OBSTCLBL:2300	2300	993	299	950	100	490
OBSTCLBM:2300	2300	993	299	920	100	480
OBSTCLBU:2300	2300	993	299	930	90	520
OBSTCLAE:2300	2300	1276	176	850	70	240
OBSTCLAL:2300	2300	1276	176	770	70	210
ODC:2376	2376	206	608	2260	360	790
SSC:2376	2376	206	352	1280	180	570
EIGENBLS:2550	2550	—	27925	—	79540	115390
EIGENCLS:2652	2652	—	44261	—	—	197420
DIXMAANA:3000	3000	—	15	90	10	30
DIXMAANB:3000	3000	—	19	110	10	20
DIXMAANC:3000	3000	—	22	130	1	60
DIXMAAND:3000	3000	—	25	130	1	10
DIXMAANE:3000	3000	—	715	2170	180	790

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANF:3000	3000	—	592	1990	120	820
DIXMAANG:3000	3000	—	517	1790	120	520
DIXMAANH:3000	3000	—	508	1730	120	750
DIXMAANI:3000	3000	—	3768	14430	1200	4190
DIXMAANJ:3000	3000	—	932	12500	370	980
DIXMAANK:3000	3000	—	714	3880	400	850
DIXMAANL:3000	3000	—	1169	9770	330	1170
DIXMAANM:3000	3000	—	3679	14490	1050	4080
DIXMAANN:3000	3000	—	3220	11470	650	3540
DIXMAANO:3000	3000	—	2603	9050	580	2740
DIXMAANP:3000	3000	—	2042	7060	920	2200
JNLBRNG1:3200	3200	1130	378	2060	370	660
JNLBRNGA:3200	3200	1168	433	2420	440	710
JNLBRNG2:3200	3200	1400	723	3310	810	1410
JNLBRNGB:3200	3200	1446	2217	7370	1790	7030
OBSTCLBL:3200	3200	1252	254	1260	210	580
OBSTCLBM:3200	3200	1252	254	1170	200	620
OBSTCLBU:3200	3200	1252	254	1120	210	640
OBSTCLAE:3200	3200	1813	228	1210	210	520
OBSTCLAL:3200	3200	1813	228	1250	210	510
JNLBRNG1:3400	3400	1195	446	1980	410	1110
JNLBRNGA:3400	3400	1233	448	2420	570	930
JNLBRNG2:3400	3400	1500	689	3400	660	1120
JNLBRNGB:3400	3400	1545	2259	7720	2540	7430
CHAINWOO:4000	4000	—	994	14940	1010	1770
CHARDIS0:4000	4000	—	4	1110	220	590
WOODS:4000	4000	—	355	1360	370	1400
HADAMALS:4096	4096	3282	795	37940	28900	3930

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
ARWHEAD:5000	5000	—	100	900	80	240
BDQRTIC:5000	5000	—	175	1050	460	1420
BROYDN7D:5000	5000	—	628	7670	1550	2020
BRYBND:5000	5000	—	64	670	100	160
BIGGSB1:5000	5000	3	37586	193620	16880	68480
BDEXP:5000	5000	5000	3	1	10	10
CRAGGLVY:5000	5000	—	302	2140	580	900
CHENHARK:5000	5000	2010	27965	95200	—	92120
DQDRTIC:5000	5000	—	23	190	20	130
DQRTIC:5000	5000	—	71	1810	50	250
ENGVAL1:5000	5000	—	63	550	60	100
FLETBV3M:5000	5000	—	89	—	140	420
FLETCBV2:5000	5000	—	20005	95120	27570	63730
FREUROTH:5000	5000	—	90	670	90	190
GENHUMPS:5000	5000	—	931	6730	1560	2400
HARKERP2:5000	5000	5000	3	350	40	50
INDEFM:5000	5000	—	247	—	320	1810
INDEF:5000	5000	5000	56	11260	80	—
LIARWHD:5000	5000	—	141	900	120	530
MOREBV:5000	5000	—	1358	8790	1730	2600
MCCORMCK:5000	5000	1	62	600	90	150
NCB20B:5000	5000	—	1316	10250	10600	5260
NONCVXU2:5000	5000	—	21643	107870	28890	96930
NONCVXUN:5000	5000	—	27482	134440	—	—
NONDIA:5000	5000	—	1910	7100	2670	—

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
NONDQUAR:5000	5000	—	766	2830	660	2010
NONSCOMP:5000	5000	2500	264	1260	230	470
POWELLSG:5000	5000	—	659	2480	570	3250
POWER:5000	5000	—	759	3200	530	2060
PENTDI:5000	5000	3751	28	220	30	120
QUARTC:5000	5000	—	71	1800	50	270
QRTQUAD:5000	5000	549	30762	110560	16600	—
QUDLIN:5000	5000	5000	12	100	20	140
SCHMVETT:5000	5000	—	167	6430	460	440
SINQUAD:5000	5000	—	137	1500	220	490
SPARSQUR:5000	5000	—	35	700	40	210
SROSENBR:5000	5000	—	624	2930	440	1800
SSBRYBND:5000	5000	—	25562	135020	49810	57700
TESTQUAD:5000	5000	—	4948	17370	16630	25870
TOINTGSS:5000	5000	—	118	920	120	260
TQUARTIC:5000	5000	—	686	3310	840	1730
TRIDIA:5000	5000	—	2829	10220	1890	8120
VAREIGVL:5000	5000	—	73	750	100	170
NCB20:5010	5010	—	633	5580	11040	2650
CLPLATEA:5041	5041	71	2190	21370	2780	4820
CLPLATEB:5041	5041	71	866	4510	1140	2320
CLPLATEC:5041	5041	71	15872	79180	—	—
ODC:5184	5184	284	627	5060	1410	1850
SSC:5184	5184	284	381	2660	650	1420
MINSURFO:5306	5306	1762	3937	23710	4890	23490
NOBNDTOR:5476	5476	801	662	6490	1520	2180

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSIONA:5476	5476	1096	704	4560	2380	2510
TORSIONB:5476	5476	1096	704	4500	2410	2530
TORSION111:5476	5476	1219	613	6080	2420	1860
TORSION1:5476	5476	1219	613	6040	2430	1840
TORSION2:5476	5476	1219	613	6680	2430	1870
TORSIONC:5476	5476	2328	422	2810	600	1520
TORSIOND:5476	5476	2328	422	2800	600	1480
TORSION3:5476	5476	2386	470	4120	630	1740
TORSION4:5476	5476	2386	470	3330	630	1740
TORSIONE:5476	5476	3782	218	1930	350	1360
TORSIONF:5476	5476	3782	218	1940	350	1350
TORSION5:5476	5476	3805	292	1840	730	910
TORSION6:5476	5476	3805	292	1680	720	910
FMINSRF2:5625	5625	—	525	3380	720	1180
FMINSURF:5625	5625	—	540	3480	750	1290
LMINSURF:5625	5625	296	1579	19420	1950	3230
NLMSURF:5625	5625	296	15218	137330	15780	33520
ODC:7344	7344	344	729	7340	2370	2680
SSC:7344	7344	344	560	4590	1040	2200
JNLBRNG1:7500	7500	2605	992	7040	2260	4170
JNLBRNGA:7500	7500	2676	959	7650	1860	3480
JNLBRNG2:7500	7500	3171	1375	12470	3690	5810
JNLBRNGB:7500	7500	3395	3265	20860	8890	24640
OBSTCLBL:7500	7500	2859	401	3590	1070	1830
OBSTCLBM:7500	7500	2859	401	3610	1080	1800
OBSTCLBU:7500	7500	2859	401	3670	1070	1820
OBSTCLAE	7500	3819	434	4700	1210	1580
OBSTCLAL:7500	7500	3819	434	4740	1220	1570
DIXMAANA:9000	9000	—	15	170	30	40
DIXMAANB:9000	9000	—	19	230	30	30
DIXMAANC:9000	9000	—	22	310	50	30

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAAND:9000	9000	—	25	340	40	50
DIXMAANE:9000	9000	—	956	7590	1960	2650
DIXMAANF:9000	9000	—	788	6450	1480	2330
DIXMAANG:9000	9000	—	804	6010	1500	2240
DIXMAANH:9000	9000	—	750	5890	1480	2100
DIXMAANI:9000	9000	—	1384	26430	5480	3970
DIXMAANJ:9000	9000	—	828	9920	1710	2330
DIXMAANK:9000	9000	—	582	15690	1570	1640
DIXMAANL:9000	9000	—	651	17360	1440	1720
DIXMAANM:9000	9000	—	1680	26290	7690	4930
DIXMAANN:9000	9000	—	1806	25290	3520	5090
DIXMAANO:9000	9000	—	2102	27880	4270	6060
DIXMAANP:9000	9000	—	2219	22370	4960	6400
BOXPOWER	10000	—	27	510	40	260
BOX	10000	—	143	1380	530	1190
BROYDN7D:10000	10000	—	589	17420	2880	2710
BRYBND:10000	10000	—	64	960	250	220
CHAINWOO:10000	10000	—	1083	8720	5940	4860
CVXBQP1:10000	10000	10000	3	10	10	10
DIXON3DQ:10000	10000	—	40009	248030	50220	202920
FLETBV3M:10000	10000	—	74	—	230	330
FLETCBV2:10000	10000	—	37579	—	101900	150670
FMINSRF2:10000	10000	—	684	6650	2050	2540
FMINSURF:10000	10000	—	667	6840	2120	2500
HARKERP2:10000	10000	10000	3	950	170	180
INDEFM:10000	10000	—	304	2930	4230	2700

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
JNLBRNG1:10000	10000	3443	1304	12830	3690	7120
JNLBRNGA:10000	10000	3568	1434	16800	5150	6810
JNLBRNG2:10000	10000	4209	1812	16780	5890	7520
JNLBRNGB:10000	10000	4484	4824	40110	12710	40460
LIARWHD:10000	10000	—	129	1070	290	510
LMINSURF:10000	10000	396	2289	39460	4340	8280
MCCORMCK:10000	10000	1	53	950	190	180
NONCVXU2:10000	10000	—	28906	277200	79200	161880
NONCVXUN:10000	10000	—	21612	185750	—	—
NONDIA:10000	10000	—	2888	20310	7660	8820
NONDQUAR:10000	10000	—	968	5900	1620	3680
NLMSURF:10000	10000	396	23680	—	36060	90780
NOBNDTOR:10000	10000	1299	993	12870	5810	5240
NONSCOMP:10000	10000	5000	237	2120	320	930
NCVXBQP3:10000	10000	9808	196	1330	480	660
NCVXBQP2:10000	10000	9934	127	1610	360	400
NCVXBQP1:10000	10000	10000	5	70	70	40
OSCIGRAD:10000	10000	—	5459	—	9350	—
OBSTCLBL:10000	10000	3896	480	4520	2100	2520
OBSTCLBM:10000	10000	3896	480	4590	2060	2520
OBSTCLBU:10000	10000	3896	480	4510	2090	2550
OBSTCLAE:10000	10000	5061	456	6190	2270	2260
OBSTCLAL:10000	10000	5061	456	5940	2250	2280
POWELLSG:10000	10000	—	590	3630	1070	3530
POWER:10000	10000	—	1012	6920	1320	2370
QUARTC:10000	10000	—	75	2830	100	320
SCHMVETT:10000	10000	—	174	12360	710	820
SINQUAD:10000	10000	—	197	3090	610	770
SPARSQUR:10000	10000	—	39	1220	100	250

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SROSENBR:10000	10000	—	881	7470	1480	2810
TOINTGSS:10000	10000	—	113	1340	280	500
TQUARTIC:10000	10000	—	1129	7550	2050	3920
TRIDIA:10000	10000	—	4021	25850	5160	18990
TORSIONA:10000	10000	1839	935	10150	3820	4910
TORSIONB:10000	10000	1839	935	10260	3800	4940
TORSION111:10000	10000	2013	954	8370	5200	6670
TORSION1:10000	10000	2013	954	8430	5240	6590
TORSION2:10000	10000	2013	954	8280	5290	6630
TORSIONC:10000	10000	4105	615	5890	3540	3770
TORSIOND:10000	10000	4105	615	5850	3500	3620
TORSION3:10000	10000	4189	566	5930	1420	3710
TORSION4:10000	10000	4189	566	6000	1410	3840
TORSIONE:10000	10000	6685	351	3580	1090	2190
TORSIONF:10000	10000	6685	351	3520	1080	2270
TORSION5:10000	10000	6720	334	3890	920	2370
TORSION6:10000	10000	6720	334	3980	910	2380
WOODS:10000	10000	—	540	5360	1460	1620
JNLBRNG1:12500	12500	4277	1506	15590	7020	13010
JNLBRNGA:12500	12500	4469	1531	19630	8210	8920
JNLBRNG2:12500	12500	5197	2422	27790	11950	13460
JNLBRNGB:12500	12500	5630	5603	54890	34460	62680
OBSTCLBL:12500	12500	4623	618	6550	2600	4180
OBSTCLBM:12500	12500	4623	618	6620	2620	4240
OBSTCLBU:12500	12500	4623	618	6720	2610	4230

problem	dim	nact	nf2g best	time in milliseconds for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
OBSTCLAE:12500	12500	6481	652	6730	4330	4020
OBSTCLAL:12500	12500	6481	652	6740	4300	4010
ODC:14544	14544	544	1705	26710	7810	9070
SSC:14544	14544	544	949	12240	3210	5710
NOBNDTOR:14884	14884	1758	1413	20920	16740	9890
TORSIONA:14884	14884	2618	1014	15660	10760	7190
TORSIONB:14884	14884	2618	1014	15700	10740	7090
TORSION111:14884	14884	2830	1130	16900	16690	7990
TORSION1:14884	14884	2830	1130	16940	16640	8050
TORSION2:14884	14884	2830	1130	16700	16530	8010
TORSIONC:14884	14884	6034	903	10570	4540	6800
TORSIOND:14884	14884	6034	903	10600	4570	7000
TORSION3:14884	14884	6137	716	8890	4020	5340
TORSION4:14884	14884	6137	716	9000	4020	5350
TORSIONE:14884	14884	9868	411	5300	1870	4080
TORSIONF:14884	14884	9868	411	5360	1860	4070
TORSION5:14884	14884	9914	544	6800	2760	4350
TORSION6:14884	14884	9914	544	6080	2740	4320
FMINSRF2:15625	15625	—	794	10040	3980	4170
FMINSURF:15625	15625	—	779	10870	3950	4120
LMINSURF:15625	15625	496	2854	71330	8900	13730
NLMSURF:15625	15625	496	32574	—	103110	176160
BOXPOWER:20000	20000	—	30	750	80	140
MODBEALE:20000	20000	—	651	8880	4260	12430
MCCORMCK:50000	50000	1	54	1980	540	570
BOX:100000	100000	—	226	7810	4910	17000
INDEFM:100000	100000	—	898	—	12710	50120
OSCIGRAD:100000	100000	—	2578	—	23870	—
DEGDIAG:100001	100001	100001	3	60	40	30
DEGTRID2:100001	100001	100001	3	80	30	20

3.8 Effort nf2g for accuracy 1e-06

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
BQP1VAR	1	1	3	3	3	3
AKIVA	2	—	70	83	89	70
BEALE	2	—	49	62	51	49
BRKMCC	2	—	27	29	27	34
CAMEL6	2	—	25	57	38	25
CLIFF	2	—	73	174	179	73
CUBE	2	—	114	154	149	114
CHEBYQAD:2	2	—	38	57	45	38
DENSCHNA	2	—	28	37	31	28
DENSCHNB	2	—	28	33	39	28
DENSCHNC	2	—	40	54	47	40
DENSCHNF	2	—	36	47	53	36
DJTL	2	—	270	270	1228	—
ENGVAL1	2	—	25	37	30	25
EXPFIT	2	—	53	56	68	53
FREUROTH	2	—	43	68	43	55
HUMPS	2	—	135	186	305	135
HAIRY	2	—	58	92	98	58
HIMMELBB	2	—	22	45	38	22
HIMMELBG	2	—	35	37	35	38
HIMMELBH	2	—	22	29	31	22
HS1	2	—	104	113	118	104
HS5	2	—	26	33	29	26
HILBERTA:2	2	—	11	13	11	28
HIMMELP1	2	1	22	51	24	22
HS2	2	1	32	35	32	35
HS3MOD	2	1	4	24	4	16
HS3	2	1	4	13	4	10
HS4	2	2	3	3	3	3
JENSMP	2	—	152	266	152	—
LOGHAIRY	2	—	74	74	127	81

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
LOGROS	2	—	182	374	226	182
MARATOSB	2	—	3169	4620	7146	3169
MEXHAT	2	—	330	425	613	330
MODBEALE	2	—	49	62	51	49
MDHOLE	2	1	9	9	9	10
OSCIGRAD:2	2	—	5382	6032	—	5382
OSCIPATH:2	2	—	202	264	340	202
ROSENBR	2	—	103	103	125	104
S308	2	—	28	33	35	28
SINEVAL	2	—	47	49	47	49
SISSER	2	—	35	64	35	52
SNAIL	2	—	25	33	27	25
SENSORS:2	2	—	31	33	31	38
SIMBQP	2	1	4	9	4	10
SIM2BQP	2	2	3	3	3	3
ZANGWIL2	2	—	11	13	11	22
BARD	3	—	174	280	174	242
BOX3	3	—	23	34	23	28
BOX2	3	1	113	139	113	257
DENSCHND	3	—	64	64	93	84
DENSCHNE	3	—	27	52	27	28
ENGVAL2	3	—	107	127	107	122
EG1	3	1	81	90	81	83
GROWTHLS	3	—	94	94	200	104
GULF	3	—	4	28	4	182
HATFLDD	3	—	71	132	71	127
HATFLDE	3	—	74	89	131	74
HATFLDFL	3	—	405	2284	638	405
HELIX	3	—	43	45	43	61
HIELOW	3	—	74	96	87	74
HS25	3	—	8	8	35	386
KOEBHELB	3	—	195	268	195	—

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
MEYER3	3	—	876	876	3180	—
PFIT1LS	3	—	52	52	—	—
PFIT2LS	3	—	52	52	—	—
PFIT3LS	3	—	52	52	—	—
PFIT4LS	3	—	52	52	—	—
SCHMVETT	3	—	54	76	54	66
SENSORS:3	3	—	97	153	100	97
SPECAN:3	3	3	3	3	3	3
WEEDS	3	1	72	112	252	72
YFIT	3	—	225	544	225	364
YFITU	3	—	364	396	461	364
ALLINITU	4	—	31	55	35	31
ALLINIT	4	2	41	58	51	41
BROWNDEN	4	—	72	81	72	85
CRAGGLVY	4	—	134	221	155	134
CHAINWOO:4	4	—	98	114	98	109
CHEBYQAD:4	4	—	48	193	108	48
HATFLDA	4	—	67	164	115	67
HIMMELBF	4	—	293	335	293	391
HS38	4	—	102	110	102	109
HILBERTA:4	4	—	19	21	19	73
HATFLDB	4	1	109	153	109	133
HADAMALS	4	3	37	38	37	50
KOWOSB	4	—	188	188	198	276
MSQRTALS	4	—	63	88	63	65
MODBEALE:4	4	—	76	76	103	103
PENALTY2	4	—	1538	3191	1649	1538
POWELLSG	4	—	120	133	120	120
PALMER1B	4	—	29	29	388	196
PALMER2B	4	—	31	31	376	221
PALMER3B	4	—	26	26	408	103
PALMER4B	4	—	31	31	309	135

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
PALMER5D	4	—	21	21	24	94
PENALTY1:4	4	—	391	687	397	391
PSPDOC	4	1	25	25	32	37
PALMER1	4	1	116	142	317	116
PALMER2	4	1	79	106	119	79
PALMER3	4	1	77	142	93	77
PALMER4	4	1	91	131	98	91
POWELLBC:4	4	4	4	5	4	4
SINEALI:4	4	—	270	270	320	272
WOODS:4	4	—	102	107	102	109
CHEBYQAD:5	5	2	61	109	74	61
EXTROSNB	5	—	322	586	381	322
GENHUMPS:5	5	—	254	333	336	254
GENROSE:5	5	—	137	216	178	137
HILBERTB	5	—	19	21	19	19
HILBERTA:5	5	—	23	25	23	148
HS45	5	5	3	3	3	3
OSBORNEA	5	5	28	28	—	—
OSCIGRAD:5	5	—	5142	5142	5555	—
SINQUAD	5	—	50	56	64	50
TQUARTIC	5	—	54	69	68	54
BIGGS6	6	—	494	7855	494	1981
BIGGS5	6	1	216	485	229	216
BIGGS3	6	3	76	117	88	76
CHEBYQAD:6	6	2	62	145	62	93
EIGENALS:6	6	—	109	127	129	109
EIGENBLS:6	6	—	101	136	155	101
HEART6LS	6	—	3316	5530	3316	3888
HILBERTA:6	6	—	23	25	23	147
HART6	6	2	59	59	74	62
PALMER6A	6	—	33	33	1688	1777

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
PALMER7A	6	—	37	37	—	—
PALMER8A	6	—	33	33	573	301
PALMER1A	6	—	45	45	1036	1136
PALMER2A	6	—	45	45	727	1052
PALMER3A	6	—	33	33	1240	796
PALMER4A	6	—	33	33	808	590
PALMER5C	6	—	27	29	27	51
SPECAN:6	6	6	3	3	3	3
CHEBYQAD:7	7	1	107	225	107	160
PALMER1D	7	—	33	33	55	—
AIRCRFTB	8	3	250	474	508	250
CHEBYQAD:8	8	2	96	334	96	172
HEART8LS	8	—	688	3058	5090	688
MAXLIKA	8	7	8	8	22	44
OSLBQP	8	7	4	10	7	4
PALMER6C	8	—	37	37	72	—
PALMER6E	8	—	70	1183	70	6263
PALMER7C	8	—	37	37	72	—
PALMER8C	8	—	37	37	52	—
PALMER8E	8	—	84	696	84	6432
PALMER1C	8	—	37	37	83	—
PALMER1E	8	—	1295	2423	1295	—
PALMER2C	8	—	37	37	78	—
PALMER3C	8	—	37	37	57	—
PALMER4C	8	—	37	37	57	—
PALMER4E	8	—	1045	1045	3271	—
PALMER5A	8	—	41	41	—	—
POWELLSG:8	8	—	203	271	203	300
PALMER7E	8	1	9017	9017	—	—
PALMER2E	8	1	2136	2136	—	—
PALMER3E	8	1	2093	2093	—	—

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
S368:8	8	6	34	34	36	61
VIBRBEAM	8	—	2753	2753	—	—
CHEBYQAD:9	9	2	98	308	98	209
MSQRTBLS	9	—	100	128	114	100
NONMSQRT	9	—	833	5135	833	—
SPECAN:9	9	9	3	3	3	3
ARGLINA:10	10	—	7	9	7	12
ARGLINB:10	10	—	7	13	7	13
ARGLINC:10	10	—	7	13	7	14
BROWNAL	10	—	75	75	75	110
BRYBND	10	—	269	667	269	273
BOXPOWER:10	10	—	21	21	43	46
BOX:10	10	—	41	41	47	52
BROYDN7D:10	10	—	94	174	114	94
CHNROSNB	10	—	217	340	225	217
CHNRSNBM	10	—	231	363	234	231
CHARDIS0:10	10	—	4	9	4	10
COSINE:10	10	—	102	102	124	150
CRAGGLVY:10	10	—	133	162	136	133
CHEBYQAD	10	2	63	319	63	162
CHENHARK:10	10	3	61	63	79	61
CVXBQP1:10	10	10	3	3	3	3
DIXON3DQ	10	—	45	45	47	84
DQDRTIC	10	—	23	25	23	61
DQRTIC:10	10	—	83	129	108	83
ERRINROS:10	10	—	370	518	370	384
ERRINRSM:10	10	—	777	1063	777	1215
EXTROSNB:10	10	—	3234	6356	3234	3406
FLETBV3M	10	—	37	66	47	37
FLETBV2	10	—	47	49	47	64
FLETBV3	10	—	67	151	104	67

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
FLETCHBV	10	—	112	182	250	112
FLETCHCR	10	—	229	372	253	229
FREUROTH:10	10	—	74	74	75	91
GENHUMPS:10	10	—	480	825	736	480
GENROSE:10	10	—	232	388	259	232
HS110	10	—	35	81	35	—
HILBERTA:10	10	—	23	25	23	164
HILBERTB:10	10	—	19	21	19	19
HARKERP2:10	10	10	3	3	3	3
INDEFM:10	10	—	126	126	148	152
INDEF:10	10	10	53	337	53	75
MOREBV	10	—	71	83	71	140
MANCINO:10	10	—	26	29	27	26
MODBEALE:10	10	—	146	146	161	773
MCCORMCK	10	1	54	64	54	90
NONCVXU2:10	10	—	75	119	95	75
NONCVXUN:10	10	—	71	71	79	80
NONDIA:10	10	—	106	135	130	106
NCVXBQP1:10	10	10	8	8	28	13
NCVXBQP2:10	10	10	5	5	26	11
NCVXBQP3:10	10	10	8	8	33	106
POWER	10	—	67	93	75	67
PENALTY1:10	10	—	313	421	378	313
PENALTY2:10	10	—	1469	2081	1824	1469
PROBPENL:10	10	4	827	827	831	4268
POWELLBC:10	10	7	17	58	73	17
RAYBENDL:10	10	4	90	123	90	98
RAYBENDS:10	10	4	154	221	233	154
SINEALI	10	—	3666	6611	3666	3726
SROSENBR	10	—	169	169	181	325

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SCHMVETT:10	10	—	90	105	90	101
SENSORS:10	10	—	60	60	111	70
SPARSINE:10	10	—	53	53	63	113
SPARSQUR:10	10	—	34	73	34	67
SSBRYBND:10	10	—	737	871	737	9650
SSCOSINE:10	10	—	372	372	477	—
TOINTGSS	10	—	108	108	130	154
TQUARTIC:10	10	—	82	118	82	86
TRIDIA:10	10	—	45	45	47	83
VARDIM	10	—	67	121	67	89
VAREIGVL:10	10	—	46	59	55	46
OSBORNEB	11	—	3847	—	—	3847
EXPQUAD:12	12	4	118	225	118	180
QRTQUAD:12	12	3	223	223	224	441
QUDLIN	12	12	8	8	21	31
WATSON:12	12	—	238	318	238	324
BRATU1D:13	13	2	65	65	74	102
DIXMAANA	15	—	19	25	19	19
DIXMAANB	15	—	19	25	19	19
DIXMAANC	15	—	19	29	23	19
DIXMAAND	15	—	25	29	27	25
DIXMAANE	15	—	61	65	101	61
DIXMAANF	15	—	61	65	83	61
DIXMAANG	15	—	64	65	87	64
DIXMAANH	15	—	61	65	87	61
DIXMAANI	15	—	113	113	187	133
DIXMAANJ	15	—	124	124	195	128

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANK	15	—	133	133	199	136
DIXMAANL	15	—	113	113	195	126
DIXMAANM	15	—	93	93	183	149
DIXMAANN	15	—	113	113	179	131
DIXMAANO	15	—	115	117	207	115
DIXMAANP	15	—	131	153	191	131
PARKCH	15	—	693	693	—	6787
CLPLATEA:16	16	4	81	87	81	86
CLPLATEB:16	16	4	83	83	85	83
CLPLATEC:16	16	4	69	69	81	131
FMINSURF	16	—	64	64	83	67
FMINSRF2:16	16	—	82	86	103	82
HADAMALS:16	16	8	109	112	109	216
LMINSURF	16	12	41	46	41	41
NLMSURF:16	16	12	49	63	52	49
NOBNDTOR:16	16	13	36	38	36	75
POWELLSG:16	16	—	366	366	663	486
TORSION111:16	16	14	22	22	22	49
TORSION1:16	16	14	22	22	22	49
TORSION2:16	16	14	22	22	22	49
TORSIONA:16	16	14	22	26	22	32
TORSIONB:16	16	14	22	26	22	32
TORSIONC:16	16	14	22	22	22	25
TORSIOND:16	16	14	22	22	22	25
TORSION3:16	16	16	7	12	7	30
TORSION4:16	16	16	7	12	7	30
TORSION5:16	16	16	4	13	4	5
TORSION6:16	16	16	4	13	4	5
TORSIONE:16	16	16	4	9	4	14
TORSIONF:16	16	16	4	9	4	14
CHARDIS0:18	18	—	4	9	4	10

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
LINVERSE	19	8	240	1246	240	477
CHEBYQAD:20	20	3	127	226	127	182
MANCINO:20	20	—	31	37	31	31
NONDIA:20	20	—	147	198	147	158
POWELLSG:20	20	—	390	390	599	677
POWER:20	20	—	79	140	120	79
POWELLBC:20	20	13	107	107	117	211
TRIDIA:20	20	—	85	85	102	152
NCB20B	21	—	190	190	510	247
NCB20B:22	22	—	254	254	651	706
RAYBENDL:24	24	4	1152	2321	—	1152
RAYBENDS:24	24	4	3570	8465	—	3570
BIGGSB1	25	3	221	288	312	221
CHNROSNB:25	25	—	383	674	795	383
CHNRSNBM:25	25	—	632	812	920	632
ERRINROS:25	25	—	452	651	—	452
ERRINRSM:25	25	—	1254	1254	—	3111
HATFLDC	25	12	49	60	69	49
NONSCOMP	25	12	333	411	333	416
OSCIPATH:25	25	—	182	219	224	182
QUARTC	25	—	39	129	39	94
SPMSRTL	28	—	175	230	239	175
X3PK	30	1	4414	4414	—	—
EIGENCLS:30	30	—	520	520	613	545
MANCINO:30	30	—	32	37	35	32
NONDIA:30	30	—	184	184	190	220
POWER:30	30	—	79	121	128	79
TRIDIA	30	—	129	129	162	224
WATSON:31	31	—	1408	1408	5959	—

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
EDENSCH	36	—	70	85	99	70
HADAMALS:36	36	24	192	275	192	324
LIARWHD	36	—	73	119	103	73
POWELLSG:36	36	—	421	421	755	1049
CHARDIS0:40	40	—	4	9	4	10
POWELLSG:40	40	—	414	414	739	837
QR3DLS:40	40	1	4330	4330	—	7155
RAYBENDL	44	4	8754	—	—	8754
CLPLATEA	49	7	143	198	249	143
CLPLATEB	49	7	137	193	241	137
CLPLATEC	49	7	288	288	405	543
FMINSRF2:49	49	—	142	153	158	142
FMINSURF:49	49	—	112	125	146	112
LMINSURF:49	49	24	96	137	133	96
MSQRTALS:49	49	—	733	899	—	733
MSQRTBLS:49	49	—	584	584	912	590
NLMSURF:49	49	24	381	474	639	381
ARGLINA:50	50	—	7	9	7	13
ARGLINB:50	50	—	7	17	7	17
ARGLINC:50	50	—	7	21	7	17
BROYDN7D:50	50	—	290	387	491	290
BRYBND:50	50	—	67	77	79	67
BQPGABIM	50	26	119	119	120	165
BQPGASIM	50	27	108	108	119	188
CHNROSNB:50	50	—	730	1058	1163	730
CHNRSNBM:50	50	—	1013	1474	1115	1013
CRAGGLVY:50	50	—	256	334	341	256
CHEBYQAD:50	50	6	196	573	1288	196
CVXBQP1:50	50	50	3	3	3	3
DQDRTIC:50	50	—	23	25	23	128
DQRTIC:50	50	—	43	131	43	104

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
ENGVAL1:50	50	—	60	83	77	60
ERRINROS:50	50	—	445	669	—	445
ERRINRSM:50	50	—	1455	1455	10100	3182
FREUROTH:50	50	—	78	78	90	79
HILBERTB:50	50	—	19	21	19	22
INDEFM:50	50	—	202	889	274	202
INDEF:50	50	50	56	310	56	216
MANCINO:50	50	—	37	50	39	37
MOREBV:50	50	—	1539	6352	1539	5333
MCCORMCK:50	50	1	56	64	56	101
NCB20B:50	50	—	1024	1024	4291	2245
NONDIA:50	50	—	145	145	199	273
NONSCOMP:50	50	25	266	382	293	266
NCVXBQP3:50	50	49	34	34	52	129
NCVXBQP1:50	50	50	5	5	28	14
NCVXBQP2:50	50	50	22	22	38	118
PENALTY3	50	—	1179	2484	1641	1179
PENALTY1:50	50	—	234	500	309	234
PENALTY2:50	50	—	482	482	733	497
POWER:50	50	—	91	132	107	91
PROBPENL:50	50	—	8204	8204	—	—
PENTDI:50	50	37	28	37	32	28
SINQUAD:50	50	—	104	111	124	104
SPARSINE:50	50	—	469	469	813	600
SPARSQUR:50	50	—	24	81	24	67
SROSENBR:50	50	—	205	245	205	373
SSBRYBND:50	50	—	5532	5532	—	—
S368:50	50	32	9	63	46	9
TOINTGOR	50	—	396	467	517	396
TOINTPSP	50	—	284	284	653	347

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TOINTQOR	50	—	113	113	142	133
TOINTGSS:50	50	—	135	146	194	135
TQUARTIC:50	50	—	110	110	225	201
TRIDIA:50	50	—	217	217	259	286
VAREIGVL	50	—	64	81	79	64
VARDIM:50	50	—	101	169	101	148
CHARDIS0:60	60	—	4	9	4	10
POWELLSG:60	60	—	432	432	711	1026
DECONVU	61	10	3206	3206	10590	8236
DECONVB	61	41	483	1074	483	—
FMINSRF2	64	—	184	215	195	184
FMINSURF:64	64	—	150	150	159	153
HADAMALS:64	64	34	177	328	177	343
LMINSURF:64	64	28	127	190	155	127
MINSURF	64	28	85	114	91	85
NLMSURF:64	64	28	482	684	696	482
POWER:75	75	—	109	152	147	109
BRATU1D	77	2	1035	1185	1546	1035
POWELLSG:80	80	—	568	568	811	900
DIXMAANA:90	90	—	15	21	15	16
DIXMAANB:90	90	—	19	25	19	19
DIXMAANC:90	90	—	22	29	23	22
DIXMAAND:90	90	—	25	29	27	25
DIXMAANE:90	90	—	158	165	213	158
DIXMAANF:90	90	—	172	172	199	176
DIXMAANG:90	90	—	144	173	191	144
DIXMAANH:90	90	—	172	189	191	172
DIXMAANI:90	90	—	529	529	738	723

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANJ:90	90	—	600	600	724	729
DIXMAANK:90	90	—	653	653	676	769
DIXMAANL:90	90	—	588	588	643	730
DIXMAANM:90	90	—	501	501	655	802
DIXMAANN:90	90	—	720	761	984	720
DIXMAANO:90	90	—	853	868	952	853
DIXMAANP:90	90	—	690	792	979	690
NONDIA:90	90	—	177	177	430	473
ARGLINA:100	100	—	7	9	7	13
ARGLINB:100	100	—	13	13	34	27
ARGLINC:100	100	—	52	52	73	79
ARWHEAD:100	100	—	57	67	75	57
BDQRTIC	100	—	133	159	296	133
BOXPOWER:100	100	—	27	29	27	55
BOX:100	100	—	83	83	92	103
BROWNAL:100	100	—	74	74	112	293
BROYDN7D:100	100	—	415	530	586	415
BRYBND:100	100	—	64	86	83	64
BDEXP	100	2	315	8903	315	—
BIGGSB1:100	100	3	904	1716	1877	904
CHARDIS0	100	—	4	9	4	10
CHAINWOO:100	100	—	1049	2117	1049	1207
COSINE:100	100	—	946	946	2591	—
CRAGGLVY:100	100	—	257	379	401	257
CURLY10:100	100	—	3726	5684	4314	3726
CURLY20:100	100	—	3064	3064	7841	4001
CURLY30:100	100	—	2324	2324	8826	4006
CHEBYQAD:100	100	4	293	663	5527	293
CLPLATEA:100	100	10	203	276	281	203
CLPLATEB:100	100	10	208	237	261	208
CLPLATEC:100	100	10	705	705	757	964

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
CHENHARK:100	100	30	5420	6896	5420	6982
CVXBQP1	100	100	3	3	3	3
DIXON3DQ:100	100	—	405	405	497	1029
DQDRTIC:100	100	—	23	25	23	37
DQRTIC:100	100	—	51	187	51	112
ENGVAL1:100	100	—	61	77	82	61
EXTROSNB:100	100	—	4860	11034	10090	4860
FLETBV3M:100	100	—	89	136	89	89
FLETGBV2:100	100	—	660	660	747	897
FLETGBV3:100	100	—	469	4554	10167	469
FLETCHCR:100	100	—	1782	2983	2505	1782
FREUROTH:100	100	—	74	74	120	86
GENHUMPS:100	100	—	1024	1404	1852	1024
GENROSE:100	100	—	1756	2978	2444	1756
HADAMALS:100	100	76	372	641	980	372
HARKERP2	100	100	3	3	3	3
INDEFM:100	100	—	262	477	935	262
INDEF:100	100	100	51	196	51	228
LIARWHD:100	100	—	74	74	103	85
MANCINO:100	100	—	42	67	43	42
MOREBV:100	100	—	9288	9288	—	11645
MSQRTALS:100	100	—	1276	2587	3471	1276
MSQRTBLS:100	100	—	2164	3078	3951	2164
MCCORMCK:100	100	1	56	64	56	71
NONDQUAR	100	—	514	514	1198	1191
NCB20B:100	100	—	1948	1948	9868	3475
NONCVXU2:100	100	—	1483	1776	1483	1549
NONCVXUN:100	100	—	567	580	567	676
NONDIA:100	100	—	369	369	674	510

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
NOBNDTOR:100	100	49	155	155	157	166
NONSCOMP:100	100	50	240	323	240	252
NCVXBQP3:100	100	98	43	43	58	111
NCVXBQP1:100	100	100	5	5	28	14
NCVXBQP2:100	100	100	21	21	37	98
OSCIPTH:100	100	—	228	283	228	245
PENALTY1:100	100	—	217	480	264	217
PENALTY2:100	100	—	265	400	585	265
PENALTY3:100	100	—	2686	5288	3205	2686
POWELLSG:100	100	—	530	530	671	910
POWER:100	100	—	112	171	131	112
PROBPENL:100	100	—	43	43	—	—
PENTDI:100	100	74	30	42	30	74
QUARTC:100	100	—	51	187	51	112
SCHMVETT:100	100	—	156	236	201	156
SENSORS:100	100	—	85	113	104	85
SINEALI:100	100	—	219	247	595	219
SINQUAD:100	100	—	97	102	97	106
SPARSINE:100	100	—	829	829	1191	936
SPARSQUR:100	100	—	27	90	27	70
SPMSRTLS:100	100	—	1449	—	1449	—
SROSENBR:100	100	—	183	226	183	435
SSBRYBND:100	100	—	10936	10936	—	—
S368:100	100	73	10	50	63	10
TOINTGSS:100	100	—	103	129	157	103
TQUARTIC:100	100	—	218	243	277	218
TRIDIA:100	100	—	341	341	417	527

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSIONA:100	100	54	118	164	118	128
TORSIONB:100	100	54	118	164	118	128
TORSION111:100	100	58	102	131	110	102
TORSION1:100	100	58	102	131	110	102
TORSION2:100	100	58	102	131	110	102
TORSIONC:100	100	67	82	92	82	95
TORSIOND:100	100	67	82	92	82	95
TORSION3:100	100	71	78	78	80	118
TORSION4:100	100	71	78	78	80	118
TORSIONE:100	100	84	50	68	50	71
TORSIONF:100	100	84	50	68	50	71
TORSION5:100	100	86	46	63	46	49
TORSION6:100	100	86	46	63	46	49
VARDIM:100	100	—	122	217	122	165
VAREIGVL:100	100	—	73	85	87	73
WOODS:100	100	—	237	237	439	526
EXPLIN:101	101	95	166	269	166	318
EXPLIN2:101	101	101	5	5	7	22
BRATU1D:103	103	2	1084	1588	2095	1084
EIGENALS	110	—	4266	5682	4854	4266
EIGENBLS	110	—	2141	3238	2141	2327
NCB20:110	110	—	1162	1162	—	3151
EXPQUAD	120	7	214	249	214	244
EXPLIN	120	70	543	543	742	566
EXPLIN2	120	101	215	314	215	400
QRTQUAD	120	5	269	269	398	515
QUDLIN:120	120	120	8	8	21	71
FMINSRF2:121	121	—	214	217	226	214
FMINSURF:121	121	—	176	197	190	176
LMINSURF:121	121	40	170	280	216	170
NLMSURF:121	121	40	946	1722	1436	946

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
HADAMALS:144	144	79	287	594	287	343
HOLMES	180	180	3	3	3	3
NCB20B:180	180	—	1298	2134	2953	1298
DRCV2LQ	196	96	4966	5125	4966	5139
DRCV3LQ	196	96	9829	10869	9829	11140
HADAMALS:196	196	161	468	763	468	516
ARGLINA:200	200	—	7	9	7	14
ARGLINB:200	200	—	28	47	28	29
ARGLINC:200	200	—	23	31	28	23
BROWNAL:200	200	—	75	75	112	436
CHARDIS0:200	200	—	4	9	4	10
MODBEALE:200	200	—	409	409	644	1748
PENALTY2:200	200	—	550	—	957	550
PENALTY3:200	200	—	6757	10571	6757	—
POWELLBC:200	200	104	2638	2638	9133	2761
VARDIM:200	200	—	120	224	120	194
HADAMALS:256	256	135	502	683	502	694
ODC:288	288	148	606	942	1317	606
SSC:288	288	148	390	436	469	390
DIXMAANA:300	300	—	15	17	15	16
DIXMAANB:300	300	—	19	25	19	19
DIXMAANC:300	300	—	22	29	23	22
DIXMAAND:300	300	—	25	29	27	25
DIXMAANE:300	300	—	277	277	342	289
DIXMAANF:300	300	—	236	317	315	236

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANG:300	300	—	239	269	304	239
DIXMAANH:300	300	—	233	296	308	233
DIXMAANI:300	300	—	1781	1781	2794	2336
DIXMAANJ:300	300	—	1452	1604	1703	1452
DIXMAANK:300	300	—	1397	1553	1671	1397
DIXMAANL:300	300	—	1248	1581	1400	1248
DIXMAANM:300	300	—	1761	1761	2787	2049
DIXMAANN:300	300	—	1904	2028	1904	2140
DIXMAANO:300	300	—	1952	2016	1952	2099
DIXMAANP:300	300	—	1868	1868	1948	2378
HADAMALS:324	324	256	499	1088	499	564
CHARDIS0:400	400	—	4	13	4	10
HADAMALS:400	400	306	545	1591	1061	545
JNLBRNG1:400	400	253	274	318	459	274
JNLBRNGA:400	400	253	317	484	444	317
JNLBRNG2:400	400	278	295	428	366	295
JNLBRNGB:400	400	302	399	399	484	417
OBSTCLBL:400	400	263	28	84	28	93
OBSTCLBM:400	400	263	28	84	28	93
OBSTCLBU:400	400	263	28	84	28	93
OBSTCLAE:400	400	398	9	9	19	31
OBSTCLAL:400	400	398	9	9	19	31
EIGENCLS	462	—	7080	7080	12459	7572
NOBNDTOR:484	484	143	192	354	347	192
TORSIONA:484	484	161	202	351	268	202
TORSIONB:484	484	161	202	351	268	202
TORSION111:484	484	186	184	303	359	184
TORSION1:484	484	186	184	303	359	184
TORSION2:484	484	186	184	303	359	184
TORSIONC:484	484	254	154	207	178	154
TORSIOND:484	484	254	154	207	178	154
TORSION3:484	484	267	193	193	194	196

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSION4:484	484	267	193	193	194	196
TORSIONE:484	484	362	107	157	124	107
TORSIONF:484	484	362	107	157	124	107
TORSION5:484	484	368	116	166	126	116
TORSION6:484	484	368	116	166	126	116
ARWHEAD:500	500	—	68	73	68	86
BDQRTIC:500	500	—	148	148	457	200
BROYDN7D:500	500	—	538	751	711	538
BRYBND:500	500	—	64	85	83	64
BDEXP:500	500	2	1514	—	1514	—
CRAGGLVY:500	500	—	290	395	426	290
DQRTIC	500	—	59	269	59	136
DQDRTIC:500	500	—	23	25	23	45
FREUROTH:500	500	—	96	98	96	133
GENHUMPS:500	500	—	953	1690	1721	953
GENROSE:500	500	—	8466	14900	8937	8466
HARKERP2:500	500	500	3	3	3	3
LIARWHD:500	500	—	99	99	158	102
MOREBV:500	500	—	1489	1636	2687	1489
MCCORMCK:500	500	1	56	71	56	79
NCB20B:500	500	—	1055	1055	3052	1390
NONDIA:500	500	—	663	663	1191	950
NONDQUAR:500	500	—	569	569	1096	965
NONSCOMP:500	500	250	266	325	266	269
OSCIPATH:500	500	—	211	218	223	211
PENALTY1:500	500	—	169	253	220	169
POWELLSG:500	500	—	645	645	763	933
POWER:500	500	—	255	269	275	255
PROBPENL:500	500	—	7	9	7	14
PENTDI:500	500	376	28	37	28	28

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
QUARTC:500	500	—	59	269	59	136
SCHMVETT:500	500	—	159	1590	232	159
SINQUAD:500	500	—	155	182	155	195
SROSENBR:500	500	—	270	270	286	384
TOINTGSS:500	500	—	109	112	134	109
TQUARTIC:500	500	—	481	514	481	494
TRIDIA:500	500	—	857	857	1062	1329
VAREIGVL:500	500	—	73	93	87	73
BRATU1D:503	503	2	6081	—	15486	6081
CLPLATEA:529	529	23	552	649	729	552
CLPLATEB:529	529	23	428	524	565	428
CLPLATEC:529	529	23	1972	1972	—	8267
ODC	864	164	576	682	865	576
SSC	864	164	397	440	556	397
FMINSRF2:961	961	—	271	582	310	271
FMINSURF:961	961	—	331	331	422	379
LMINSURF:961	961	120	607	1319	826	607
NLMSURF:961	961	120	4301	7534	6339	4301
ARWHEAD:1000	1000	—	64	77	64	97
BDQRTIC:1000	1000	—	171	171	459	326
BOXPOWER:1000	1000	—	42	49	42	78
BOX:1000	1000	—	141	163	141	199
BROWNAL:1000	1000	—	107	107	108	180

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
BROYDN7D:1000	1000	—	526	914	736	526
BRYBND:1000	1000	—	64	91	83	64
BDEXP:1000	1000	2	3017	—	3017	—
BIGGSB1:1000	1000	3	7917	10385	14979	7917
CHAINWOO	1000	—	903	903	1140	1243
CURLY10	1000	—	25995	—	27410	25995
CHARDIS0:1000	1000	—	4	13	4	10
CRAGGLVY:1000	1000	—	271	372	423	271
CVXBQP1:1000	1000	1000	3	3	3	3
DIXON3DQ:1000	1000	—	4005	4005	4997	11134
DQDRTIC:1000	1000	—	23	25	23	59
DQRTIC:1000	1000	—	63	259	63	144
EG2	1000	—	428	428	622	632
ENGVAL1:1000	1000	—	66	97	73	66
EXTROSNB:1000	1000	—	4970	17526	10534	4970
FLETBV3M:1000	1000	—	52	155	52	88
FLETCBV2:1000	1000	—	4009	4009	9207	6471
FLETCBV3:1000	1000	—	14177	—	—	14177
FLETCHCR:1000	1000	—	16834	29965	17254	16834
FREUROTH:1000	1000	—	76	90	95	76
GENHUMPS	1000	—	1097	1414	1614	1097
HARKERP2:1000	1000	1000	3	3	3	3
INDEFM	1000	—	558	—	685	558
INDEF	1000	1000	53	179	53	305
JNLBRNG1:1000	1000	366	278	375	452	278
JNLBRNGA:1000	1000	385	329	545	548	329
JNLBRNG2:1000	1000	524	505	709	941	505

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
JNLBRNGB:1000	1000	560	1347	1447	1976	1347
LIARWHD:1000	1000	—	108	108	133	152
MOREBV:1000	1000	—	1468	2252	2925	1468
MCCORMCK:1000	1000	1	59	71	59	63
NONCVXU2	1000	—	5407	5407	5628	7723
NONCVXUN	1000	—	10021	16873	10021	—
NONDIA	1000	—	1340	1805	2052	1340
NCB20B:1000	1000	—	1244	1244	3101	1514
NONDQUAR:1000	1000	—	618	618	755	807
NONSCOMP:1000	1000	500	274	290	282	274
NCVXBQP3	1000	983	93	93	104	151
NCVXBQP2	1000	993	80	91	80	132
NCVXBQP1	1000	1000	5	5	28	16
OSCIGRAD:1000	1000	—	1486	—	1486	—
OBSTCLBL	1000	680	170	213	170	209
OBSTCLBM	1000	680	170	213	170	209
OBSTCLBU	1000	680	170	213	170	209
OBSTCLAL	1000	696	72	168	72	99
OBSTCLAE:1000	1000	696	72	168	72	99
PENALTY1:1000	1000	—	151	314	182	151
POWELLSG:1000	1000	—	575	575	967	1002
POWER:1000	1000	—	348	387	379	348
POWELLBC:1000	1000	501	10829	—	—	10829
PENTDI	1000	751	25	37	28	25
QUARTC:1000	1000	—	63	259	63	144
SPARSINE	1000	—	17332	17332	19749	17808
SPARSQUR	1000	—	31	112	31	73
SSBRYBND	1000	—	20657	20657	—	22765

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SCHMVETT:1000	1000	—	185	456	219	185
SENSORS:1000	1000	—	111	272	196	111
SINEALI:1000	1000	—	192	295	501	192
SINQUAD:1000	1000	—	145	154	184	145
SROSENBR:1000	1000	—	278	278	359	513
TESTQUAD	1000	—	4056	4056	—	13949
TOINTGSS:1000	1000	—	99	141	127	99
TQUARTIC:1000	1000	—	291	291	679	547
TRIDIA:1000	1000	—	1237	1237	1542	2163
VAREIGVL:1000	1000	—	73	93	87	73
WOODS:1000	1000	—	335	335	439	557
BRATU1D:1003	1003	1003	20170	—	—	20170
NCB20	1010	—	556	556	17300	1094
CLPLATEA:1024	1024	32	870	1091	1241	870
CLPLATEB:1024	1024	32	529	615	633	529
CLPLATEC:1024	1024	32	3652	3652	—	21337
FMINSRF2:1024	1024	—	283	335	334	283
FMINSURF:1024	1024	—	370	412	402	370
HADAMALS:1024	1024	801	583	3029	1670	583
LMINSURF:1024	1024	124	662	1339	895	662
NLMSURF	1024	124	4388	7211	6702	4388
NOBNDTOR:1024	1024	235	319	426	545	319
TORSIONA:1024	1024	281	278	667	463	278
TORSIONB:1024	1024	281	278	667	463	278
TORSION111:1024	1024	323	242	577	533	242
TORSION1:1024	1024	323	242	577	533	242

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSION2:1024	1024	323	242	577	533	242
TORSIONC:1024	1024	493	153	280	267	153
TORSIOND:1024	1024	493	153	280	267	153
TORSION3:1024	1024	515	185	285	342	185
TORSION4:1024	1024	515	185	285	342	185
TORSIONE:1024	1024	761	160	181	181	160
TORSIONF:1024	1024	761	160	181	181	160
TORSION5:1024	1024	768	157	222	183	157
TORSION6:1024	1024	768	157	222	183	157
EXPQUAD:1200	1200	81	714	714	1158	1126
EXPLIN:1200	1200	1150	490	490	742	623
EXPLIN2:1200	1200	1181	197	321	197	374
QRTQUAD:1200	1200	50	1309	1309	6677	6114
QUDLIN:1200	1200	1200	11	11	30	135
DIXMAANA:1500	1500	—	15	17	15	16
DIXMAANB:1500	1500	—	19	25	19	19
DIXMAANC:1500	1500	—	22	29	23	22
DIXMAAND:1500	1500	—	25	29	27	25
DIXMAANE:1500	1500	—	557	557	717	557
DIXMAANF:1500	1500	—	461	537	548	461
DIXMAANG:1500	1500	—	431	521	483	431
DIXMAANH:1500	1500	—	395	469	528	395
DIXMAANI:1500	1500	—	5665	6021	9162	5665
DIXMAANJ:1500	1500	—	2451	3357	2451	2575
DIXMAANK:1500	1500	—	2325	2325	2951	2387
DIXMAANL:1500	1500	—	1010	1795	2187	1010

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANM:1500	1500	—	5348	6637	9097	5348
DIXMAANN:1500	1500	—	2478	3549	3004	2478
DIXMAANO:1500	1500	—	2290	3136	2688	2290
DIXMAANP:1500	1500	—	1963	3184	2944	1963
CHARDIS0:2000	2000	—	4	13	4	10
EDENSCH:2000	2000	—	75	89	106	75
MODBEALE:2000	2000	—	495	495	771	1968
NCB20B:2000	2000	—	1176	2966	2560	1176
BQPGAUSS	2003	134	16618	36594	37467	16618
JNLBRNG1:2300	2300	809	348	527	596	348
JNLBRNGA:2300	2300	847	396	583	671	396
JNLBRNGB:2300	2300	1052	1772	1772	3057	1878
JNLBRNG2:2300	2300	1077	623	795	1119	623
OBSTCLBL:2300	2300	993	299	326	334	299
OBSTCLBM:2300	2300	993	299	326	334	299
OBSTCLBU:2300	2300	993	299	326	334	299
OBSTCLAE:2300	2300	1276	176	279	253	176
OBSTCLAL:2300	2300	1276	176	279	253	176
ODC:2376	2376	206	608	680	1033	608
SSC:2376	2376	206	352	352	507	379
EIGENBLS:2550	2550	—	27925	—	30065	27925
EIGENCLS:2652	2652	—	44261	—	—	44261
DIXMAANA:3000	3000	—	15	17	15	16
DIXMAANB:3000	3000	—	19	25	19	19
DIXMAANC:3000	3000	—	22	29	23	22
DIXMAAND:3000	3000	—	25	29	27	25
DIXMAANE:3000	3000	—	715	741	1087	715

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANF:3000	3000	—	592	661	592	598
DIXMAANG:3000	3000	—	517	593	600	517
DIXMAANH:3000	3000	—	508	573	556	508
DIXMAANI:3000	3000	—	3768	5413	8162	3768
DIXMAANJ:3000	3000	—	932	4717	1952	932
DIXMAANK:3000	3000	—	714	1465	2015	714
DIXMAANL:3000	3000	—	1169	3597	1680	1169
DIXMAANM:3000	3000	—	3679	5657	7072	3679
DIXMAANN:3000	3000	—	3220	4077	3412	3220
DIXMAANO:3000	3000	—	2603	3285	2972	2603
DIXMAANP:3000	3000	—	2042	2669	4812	2042
JNLBRNG1:3200	3200	1130	378	555	567	378
JNLBRNGA:3200	3200	1168	433	727	724	433
JNLBRNG2:3200	3200	1400	723	950	1422	723
JNLBRNGB:3200	3200	1446	2217	2217	3524	3247
OBSTCLBL:3200	3200	1252	254	298	298	254
OBSTCLBM:3200	3200	1252	254	298	298	254
OBSTCLBU:3200	3200	1252	254	298	298	254
OBSTCLAE:3200	3200	1813	228	351	311	228
OBSTCLAL:3200	3200	1813	228	351	311	228
JNLBRNG1:3400	3400	1195	446	551	577	446
JNLBRNGA:3400	3400	1233	448	672	764	448
JNLBRNG2:3400	3400	1500	689	924	1115	689
JNLBRNGB:3400	3400	1545	2259	2259	4498	3387
CHAINWOO:4000	4000	—	994	4024	1762	994
CHARDIS0:4000	4000	—	4	13	4	10
WOODS:4000	4000	—	355	355	750	916
HADAMALS:4096	4096	3282	795	5111	7325	795

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
ARWHEAD:5000	5000	—	100	175	100	144
BDQRTIC:5000	5000	—	175	175	466	765
BROYDN7D:5000	5000	—	628	1130	814	628
BRYBND:5000	5000	—	64	91	83	64
BIGGSB1:5000	5000	3	37586	52748	37586	38398
BDEXP:5000	5000	5000	3	3	3	3
CRAGGLVY:5000	5000	—	302	379	493	302
CHENHARK:5000	5000	2010	27965	27965	—	52586
DQDRTIC:5000	5000	—	23	25	23	58
DQRTIC:5000	5000	—	71	451	71	165
ENGVAL1:5000	5000	—	63	82	80	63
FLETBV3M:5000	5000	—	89	—	89	119
FLETGBV2:5000	5000	—	20005	20005	33497	24454
FREUROTH:5000	5000	—	90	103	95	90
GENHUMPS:5000	5000	—	931	1524	1446	931
HARKERP2:5000	5000	5000	3	3	3	3
INDEFM:5000	5000	—	247	—	247	626
INDEF:5000	5000	5000	56	2498	56	—
LIARWHD:5000	5000	—	141	179	141	227
MOREBV:5000	5000	—	1358	2252	2927	1358
MCCORMCK:5000	5000	1	62	80	65	62
NCB20B:5000	5000	—	1316	1316	4447	1327
NONCVXU2:5000	5000	—	21643	21643	23699	41714
NONCVXUN:5000	5000	—	27482	27482	—	—
NONDIA:5000	5000	—	1910	1910	3453	—

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
NONDQUAR:5000	5000	—	766	766	952	1239
NONSCOMP:5000	5000	2500	264	325	285	264
POWELLSG:5000	5000	—	659	659	803	1082
POWER:5000	5000	—	759	827	828	759
PENTDI:5000	5000	3751	28	41	28	28
QUARTC:5000	5000	—	71	451	71	165
QRTQUAD:5000	5000	549	30762	30762	32853	—
QUDLIN:5000	5000	5000	12	12	27	64
SCHMVETT:5000	5000	—	167	1013	271	167
SINQUAD:5000	5000	—	137	269	164	137
SPARSQUR:5000	5000	—	35	100	35	94
SROSENBR:5000	5000	—	624	822	624	754
SSBRYBND:5000	5000	—	25562	27616	47365	25562
TESTQUAD:5000	5000	—	4948	4948	35467	18835
TOINTGSS:5000	5000	—	118	146	118	127
TQUARTIC:5000	5000	—	686	839	1123	686
TRIDIA:5000	5000	—	2829	2829	3537	4428
VAREIGVL:5000	5000	—	73	93	87	73
NCB20:5010	5010	—	633	703	4474	633
CLPLATEA:5041	5041	71	2190	4246	3697	2190
CLPLATEB:5041	5041	71	866	866	1497	1107
CLPLATEC:5041	5041	71	15872	15872	—	—
ODC:5184	5184	284	627	755	1225	627
SSC:5184	5184	284	381	381	637	469
MINSURFO:5306	5306	1762	3937	3949	3937	6897
NOBNDTOR:5476	5476	801	662	1145	1280	662

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSIONA:5476	5476	1096	704	765	1600	704
TORSIONB:5476	5476	1096	704	765	1600	704
TORSION111:5476	5476	1219	613	1094	1693	613
TORSION1:5476	5476	1219	613	1094	1693	613
TORSION2:5476	5476	1219	613	1094	1693	613
TORSIONC:5476	5476	2328	422	466	444	422
TORSIOND:5476	5476	2328	422	466	444	422
TORSION3:5476	5476	2386	470	585	470	478
TORSION4:5476	5476	2386	470	585	470	478
TORSIONE:5476	5476	3782	218	338	218	367
TORSIONF:5476	5476	3782	218	338	218	367
TORSION5:5476	5476	3805	292	329	457	292
TORSION6:5476	5476	3805	292	329	457	292
FMINSRF2:5625	5625	—	525	632	637	525
FMINSURF:5625	5625	—	540	638	638	540
LMINSURF:5625	5625	296	1579	3672	2501	1579
NLMSURF:5625	5625	296	15218	26059	20488	15218
ODC:7344	7344	344	729	899	1573	729
SSC:7344	7344	344	560	560	755	569
JNLBRNG1:7500	7500	2605	992	1014	1309	992
JNLBRNGA:7500	7500	2676	959	1180	1428	959
JNLBRNG2:7500	7500	3171	1375	1814	2680	1375
JNLBRNGB:7500	7500	3395	3265	3265	7179	6779
OBSTCLBL:7500	7500	2859	401	534	553	401
OBSTCLBM:7500	7500	2859	401	534	553	401
OBSTCLBU:7500	7500	2859	401	534	553	401
OBSTCLAE	7500	3819	434	728	695	434
OBSTCLAL:7500	7500	3819	434	728	695	434
DIXMAANA:9000	9000	—	15	17	15	16
DIXMAANB:9000	9000	—	19	25	19	19
DIXMAANC:9000	9000	—	22	29	23	22

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAAND:9000	9000	—	25	33	27	25
DIXMAANE:9000	9000	—	956	1145	1492	956
DIXMAANF:9000	9000	—	788	957	876	788
DIXMAANG:9000	9000	—	804	905	879	804
DIXMAANH:9000	9000	—	750	863	860	750
DIXMAANI:9000	9000	—	1384	4089	4252	1384
DIXMAANJ:9000	9000	—	828	1501	1030	828
DIXMAANK:9000	9000	—	582	2388	943	582
DIXMAANL:9000	9000	—	651	2566	875	651
DIXMAANM:9000	9000	—	1680	4080	5972	1680
DIXMAANN:9000	9000	—	1806	3916	2147	1806
DIXMAANO:9000	9000	—	2102	4313	2603	2102
DIXMAANP:9000	9000	—	2219	3417	3015	2219
BOXPOWER	10000	—	27	41	27	99
BOX	10000	—	143	143	202	322
BROYDN7D:10000	10000	—	589	1741	795	589
BRYBND:10000	10000	—	64	91	83	64
CHAINWOO:10000	10000	—	1083	1083	2532	1334
CVXBQP1:10000	10000	10000	3	3	3	3
DIXON3DQ:10000	10000	—	40009	40009	50002	76220
FLETBV3M:10000	10000	—	74	—	74	77
FLETCBV2:10000	10000	—	37579	—	50022	37579
FMINSRF2:10000	10000	—	684	791	823	684
FMINSURF:10000	10000	—	667	799	823	667
HARKERP2:10000	10000	10000	3	3	3	3
INDEFM:10000	10000	—	304	304	1433	579

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
JNLBRNG1:10000	10000	3443	1304	1464	1520	1304
JNLBRNGA:10000	10000	3568	1434	1918	2415	1434
JNLBRNG2:10000	10000	4209	1812	1989	3572	1812
JNLBRNGB:10000	10000	4484	4824	4824	9024	8343
LIARWHD:10000	10000	—	129	129	150	185
LMINSURF:10000	10000	396	2289	4580	3491	2289
MCCORMCK:10000	10000	1	53	80	60	53
NONCVXU2:10000	10000	—	28906	31832	28906	41448
NONCVXUN:10000	10000	—	21612	21612	—	—
NONDIA:10000	10000	—	2888	3167	5248	2888
NONDQUAR:10000	10000	—	968	968	1146	1287
NLMSURF:10000	10000	396	23680	—	29544	23680
NOBNDTOR:10000	10000	1299	993	1433	2172	993
NONSCOMP:10000	10000	5000	237	311	237	291
NCVXBQP3:10000	10000	9808	196	243	285	196
NCVXBQP2:10000	10000	9934	127	299	226	127
NCVXBQP1:10000	10000	10000	5	5	28	18
OSCIGRAD:10000	10000	—	5459	—	5459	—
OBSTCLBL:10000	10000	3896	480	527	750	480
OBSTCLBM:10000	10000	3896	480	527	750	480
OBSTCLBU:10000	10000	3896	480	527	750	480
OBSTCLAE:10000	10000	5061	456	718	747	456
OBSTCLAL:10000	10000	5061	456	718	747	456
POWELLSG:10000	10000	—	590	590	797	1218
POWER:10000	10000	—	1012	1160	1176	1012
QUARTC:10000	10000	—	75	457	75	173
SCHMVETT:10000	10000	—	174	1263	229	174
SINQUAD:10000	10000	—	197	245	211	197
SPARSQUR:10000	10000	—	39	120	39	73

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SROSENBR:10000	10000	—	881	1228	1080	881
TOINTGSS:10000	10000	—	113	143	113	136
TQUARTIC:10000	10000	—	1129	1207	1306	1129
TRIDIA:10000	10000	—	4021	4021	5017	7560
TORSIONA:10000	10000	1839	935	1124	1409	935
TORSIONB:10000	10000	1839	935	1124	1409	935
TORSION111:10000	10000	2013	954	954	2103	1263
TORSION1:10000	10000	2013	954	954	2103	1263
TORSION2:10000	10000	2013	954	954	2103	1263
TORSIONC:10000	10000	4105	615	651	1173	615
TORSIOND:10000	10000	4105	615	651	1173	615
TORSION3:10000	10000	4189	566	689	566	676
TORSION4:10000	10000	4189	566	689	566	676
TORSIONE:10000	10000	6685	351	398	351	399
TORSIONF:10000	10000	6685	351	398	351	399
TORSION5:10000	10000	6720	334	455	334	416
TORSION6:10000	10000	6720	334	455	334	416
WOODS:10000	10000	—	540	813	910	540
JNLBRNG1:12500	12500	4277	1506	1506	1949	1981
JNLBRNGA:12500	12500	4469	1531	1989	2853	1531
JNLBRNG2:12500	12500	5197	2422	2759	4614	2422
JNLBRNGB:12500	12500	5630	5603	5603	13960	11550
OBSTCLBL:12500	12500	4623	618	646	684	618
OBSTCLBM:12500	12500	4623	618	646	684	618
OBSTCLBU:12500	12500	4623	618	646	684	618

problem	dim	nact	nf2g best	nf2g for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
OBSTCLAE:12500	12500	6481	652	681	977	652
OBSTCLAL:12500	12500	6481	652	681	977	652
ODC:14544	14544	544	1705	2089	2725	1705
SSC:14544	14544	544	949	960	1359	949
NOBNDTOR:14884	14884	1758	1413	1862	4025	1413
TORSIONA:14884	14884	2618	1014	1336	2600	1014
TORSIONB:14884	14884	2618	1014	1336	2600	1014
TORSION111:14884	14884	2830	1130	1467	3913	1130
TORSION1:14884	14884	2830	1130	1467	3913	1130
TORSION2:14884	14884	2830	1130	1467	3913	1130
TORSIONC:14884	14884	6034	903	910	945	903
TORSIOND:14884	14884	6034	903	910	945	903
TORSION3:14884	14884	6137	716	775	962	716
TORSION4:14884	14884	6137	716	775	962	716
TORSIONE:14884	14884	9868	411	463	411	501
TORSIONF:14884	14884	9868	411	463	411	501
TORSION5:14884	14884	9914	544	544	640	587
TORSION6:14884	14884	9914	544	544	640	587
FMINSRF2:15625	15625	—	794	882	985	794
FMINSURF:15625	15625	—	779	916	985	779
LMINSURF:15625	15625	496	2854	6246	4533	2854
NLMSURF:15625	15625	496	32574	—	53588	32574
BOXPOWER:20000	20000	—	30	49	30	46
MODBEALE:20000	20000	—	651	651	849	1704
MCCORMCK:50000	50000	1	54	80	64	54
BOX:100000	100000	—	226	226	403	804
INDEFM:100000	100000	—	898	—	898	2276
OSCIGRAD:100000	100000	—	2578	—	2578	—
DEGDIAG:100001	100001	100001	3	3	3	3
DEGTRID2:100001	100001	100001	3	3	3	3

3.9 Number of gradients evaluations, accuracy 1e-06

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
BQP1VAR	1	1	3	1	1	1
AKIVA	2	—	70	18	26	22
BEALE	2	—	49	15	13	16
BRKMCC	2	—	27	6	7	11
CAMEL6	2	—	25	12	10	8
CLIFF	2	—	73	43	55	24
CUBE	2	—	114	34	40	37
CHEBYQAD:2	2	—	38	12	12	12
DENSCHNA	2	—	28	9	8	9
DENSCHNB	2	—	28	8	10	9
DENSCHNC	2	—	40	12	12	13
DENSCHNF	2	—	36	11	15	11
DJTL	2	—	270	51	395	—
ENGVAL1	2	—	25	9	8	8
EXPFIT	2	—	53	13	20	17
FREUROTH	2	—	43	15	11	18
HUMPS	2	—	135	40	87	44
HAIRY	2	—	58	21	27	18
HIMMELBB	2	—	22	11	11	7
HIMMELBG	2	—	35	9	9	12
HIMMELBH	2	—	22	7	8	7
HS1	2	—	104	27	32	34
HS5	2	—	26	6	8	8
HILBERTA:2	2	—	11	3	3	9
HIMMELP1	2	1	22	11	7	7
HS2	2	1	32	8	9	11
HS3MOD	2	1	4	4	1	5
HS3	2	1	4	2	1	3
HS4	2	2	3	1	1	1
JENSMP	2	—	152	62	45	—
LOGHAIRY	2	—	74	15	37	25

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
LOGROS	2	—	182	82	64	59
MARATOSB	2	—	3169	1017	2159	1017
MEXHAT	2	—	330	97	185	109
MODBEALE	2	—	49	15	13	16
MDHOLE	2	1	9	2	3	3
OSCIGRAD:2	2	—	5382	1337	—	1719
OSCIPATH:2	2	—	202	58	97	66
ROSENBR	2	—	103	25	34	34
S308	2	—	28	8	9	9
SINEVAL	2	—	47	12	13	16
SISSER	2	—	35	16	9	17
SNAIL	2	—	25	8	7	8
SENSORS:2	2	—	31	8	9	12
SIMBQP	2	1	4	2	1	3
SIM2BQP	2	2	3	1	1	1
ZANGWIL2	2	—	11	3	3	6
BARD	3	—	174	69	46	69
BOX3	3	—	23	8	6	9
BOX2	3	1	113	34	29	80
DENSCHND	3	—	64	16	24	27
DENSCHNE	3	—	27	12	7	9
ENGVAL2	3	—	107	30	27	39
EG1	3	1	81	20	22	26
GROWTHLS	3	—	94	22	59	33
GULF	3	—	4	7	1	59
HATFLDD	3	—	71	32	18	41
HATFLDE	3	—	74	22	36	24
HATFLDFL	3	—	405	500	179	127
HELIX	3	—	43	11	11	20
HIELOW	3	—	74	21	25	24
HS25	3	—	8	2	11	119
KOEBHELB	3	—	195	65	58	—

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
MEYER3	3	—	876	179	941	—
PFIT1LS	3	—	52	13	—	—
PFIT2LS	3	—	52	13	—	—
PFIT3LS	3	—	52	13	—	—
PFIT4LS	3	—	52	13	—	—
SCHMVETT	3	—	54	17	15	21
SENSORS:3	3	—	97	36	27	32
SPECAN:3	3	3	3	1	1	1
WEEDS	3	1	72	26	68	21
YFIT	3	—	225	123	65	115
YFITU	3	—	364	90	128	115
ALLINITU	4	—	31	11	9	10
ALLINIT	4	2	41	14	15	13
BROWNDEN	4	—	72	20	19	27
CRAGGLVY	4	—	134	51	41	44
CHAINWOO:4	4	—	98	26	26	35
CHEBYQAD:4	4	—	48	39	31	15
HATFLDA	4	—	67	35	32	22
HIMMELBF	4	—	293	76	84	125
HS38	4	—	102	25	27	35
HILBERTA:4	4	—	19	5	5	24
HATFLDB	4	1	109	33	30	40
HADAMALS	4	3	37	9	11	16
KOWOSB	4	—	188	43	53	85
MSQRTALS	4	—	63	21	16	21
MODBEALE:4	4	—	76	18	27	34
PENALTY2	4	—	1538	713	451	500
POWELLSG	4	—	120	32	31	39
PALMER1B	4	—	29	6	112	61
PALMER2B	4	—	31	6	109	70
PALMER3B	4	—	26	5	117	33
PALMER4B	4	—	31	6	89	42

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
PALMER5D	4	—	21	5	7	30
PENALTY1:4	4	—	391	153	107	125
PSPDOC	4	1	25	6	9	12
PALMER1	4	1	116	34	93	35
PALMER2	4	1	79	23	33	24
PALMER3	4	1	77	34	26	23
PALMER4	4	1	91	31	26	28
POWELLBC:4	4	4	4	1	1	1
SINEALI:4	4	—	270	59	85	88
WOODS:4	4	—	102	25	27	35
CHEBYQAD:5	5	2	61	22	22	19
EXTROSNB	5	—	322	135	98	103
GENHUMPS:5	5	—	254	75	92	82
GENROSE:5	5	—	137	48	48	45
HILBERTB	5	—	19	5	5	6
HILBERTA:5	5	—	23	6	6	46
HS45	5	5	3	1	1	1
OSBORNEA	5	5	28	6	—	—
OSCIGRAD:5	5	—	5142	1164	1559	—
SINQUAD	5	—	50	13	17	16
TQUARTIC	5	—	54	16	18	17
BIGGS6	6	—	494	1770	131	624
BIGGS5	6	1	216	111	60	70
BIGGS3	6	3	76	27	26	25
CHEBYQAD:6	6	2	62	32	18	29
EIGENALS:6	6	—	109	30	34	35
EIGENBLS:6	6	—	101	32	41	33
HEART6LS	6	—	3316	1248	908	1250
HILBERTA:6	6	—	23	6	6	48
HART6	6	2	59	13	22	20
PALMER6A	6	—	33	7	451	564

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
PALMER7A	6	—	37	8	—	—
PALMER8A	6	—	33	7	155	95
PALMER1A	6	—	45	10	282	360
PALMER2A	6	—	45	10	202	327
PALMER3A	6	—	33	7	326	256
PALMER4A	6	—	33	7	213	186
PALMER5C	6	—	27	7	7	15
SPECAN:6	6	6	3	1	1	1
CHEBYQAD:7	7	1	107	50	31	51
PALMER1D	7	—	33	8	18	—
AIRCRAFTB	8	3	250	108	137	81
CHEBYQAD:8	8	2	96	72	25	54
HEART8LS	8	—	688	697	1388	221
MAXLIKA	8	7	8	2	7	1
OSLBQP	8	7	4	2	2	1
PALMER6C	8	—	37	9	24	—
PALMER6E	8	—	70	277	16	1966
PALMER7C	8	—	37	9	24	—
PALMER8C	8	—	37	9	17	—
PALMER8E	8	—	84	162	22	2015
PALMER1C	8	—	37	9	28	—
PALMER1E	8	—	1295	564	344	—
PALMER2C	8	—	37	9	26	—
PALMER3C	8	—	37	9	19	—
PALMER4C	8	—	37	9	19	—
PALMER4E	8	—	1045	245	885	—
PALMER5A	8	—	41	9	—	—
POWELLSG:8	8	—	203	66	51	95
PALMER7E	8	1	9017	2087	—	—
PALMER2E	8	1	2136	503	—	—
PALMER3E	8	1	2093	494	—	—

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
S368:8	8	6	34	8	11	10
VIBRBEAM	8	—	2753	606	—	—
CHEBYQAD:9	9	2	98	71	28	67
MSQRTBLS	9	—	100	30	29	33
NONMSQRT	9	—	833	1177	222	—
SPECAN:9	9	9	3	1	1	1
ARGLINA:10	10	—	7	2	2	3
ARGLINB:10	10	—	7	3	2	3
ARGLINC:10	10	—	7	3	2	3
BROWNAL	10	—	75	18	19	36
BRYBND	10	—	269	155	69	85
BOXPOWER:10	10	—	21	5	13	15
BOX:10	10	—	41	10	12	17
BROYDN7D:10	10	—	94	41	29	31
CHNROSNB	10	—	217	81	57	71
CHNRSNBM	10	—	231	86	59	75
CHARDIS0:10	10	—	4	2	1	3
COSINE:10	10	—	102	25	33	47
CRAGGLVY:10	10	—	133	37	35	44
CHEBYQAD	10	2	63	71	17	51
CHENHARK:10	10	3	61	14	22	20
CVXBQP1:10	10	10	3	1	1	1
DIXON3DQ	10	—	45	11	15	27
DQDRTIC	10	—	23	6	6	20
DQRTIC:10	10	—	83	31	29	26
ERRINROS:10	10	—	370	120	97	123
ERRINRSM:10	10	—	777	248	203	385
EXTROSNB:10	10	—	3234	1510	839	1076
FLETBV3M	10	—	37	15	13	8
FLETBV2	10	—	47	12	12	21
FLETBV3	10	—	67	35	28	17

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
FLETCHBV	10	—	112	44	69	30
FLETCHCR	10	—	229	86	64	75
FREUROTH:10	10	—	74	18	20	29
GENHUMPS:10	10	—	480	187	195	153
GENROSE:10	10	—	232	92	69	75
HS110	10	—	35	15	10	—
HILBERTA:10	10	—	23	6	6	51
HILBERTB:10	10	—	19	5	5	6
HARKERP2:10	10	10	3	1	1	1
INDEFM:10	10	—	126	30	40	45
INDEF:10	10	10	53	81	17	1
MOREBV	10	—	71	20	18	45
MANCINO:10	10	—	26	7	7	8
MODBEALE:10	10	—	146	35	42	252
MCCORMCK	10	1	54	15	15	28
NONCVXU2:10	10	—	75	29	25	24
NONCVXUN:10	10	—	71	17	20	26
NONDIA:10	10	—	106	33	33	35
NCVXBQP1:10	10	10	8	2	8	1
NCVXBQP2:10	10	10	5	1	8	1
NCVXBQP3:10	10	10	8	2	10	8
POWER	10	—	67	22	21	22
PENALTY1:10	10	—	313	92	102	102
PENALTY2:10	10	—	1469	458	486	468
PROBPENL:10	10	4	827	175	252	1372
POWELLBC:10	10	7	17	13	20	1
RAYBENDL:10	10	4	90	30	24	32
RAYBENDS:10	10	4	154	53	62	48
SINEALI	10	—	3666	1563	948	1196
SROSENBR	10	—	169	40	46	105

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SCHMVETT:10	10	—	90	26	24	33
SENSORS:10	10	—	60	14	31	21
SPARSINE:10	10	—	53	13	16	37
SPARSQUR:10	10	—	34	18	10	22
SSBRYBND:10	10	—	737	205	201	3109
SSCOSINE:10	10	—	372	86	136	—
TOINTGSS	10	—	108	25	34	50
TQUARTIC:10	10	—	82	28	21	28
TRIDIA:10	10	—	45	11	15	27
VARDIM	10	—	67	29	17	29
VAREIGVL:10	10	—	46	14	14	15
OSBORNEB	11	—	3847	—	—	1213
EXPQUAD:12	12	4	118	53	33	54
QRTQUAD:12	12	3	223	44	57	137
QUDLIN	12	12	8	2	7	7
WATSON:12	12	—	238	76	61	104
BRATU1D:13	13	2	65	15	20	33
DIXMAANA	15	—	19	6	5	6
DIXMAANB	15	—	19	6	5	6
DIXMAANC	15	—	19	7	6	6
DIXMAAND	15	—	25	7	7	8
DIXMAANE	15	—	61	16	33	20
DIXMAANF	15	—	61	16	21	20
DIXMAANG	15	—	64	16	22	21
DIXMAANH	15	—	61	16	22	20
DIXMAANI	15	—	113	28	47	43
DIXMAANJ	15	—	124	31	49	42

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANK	15	—	133	33	50	45
DIXMAANL	15	—	113	28	49	41
DIXMAANM	15	—	93	23	58	48
DIXMAANN	15	—	113	28	45	42
DIXMAANO	15	—	115	29	52	38
DIXMAANP	15	—	131	38	48	43
PARKCH	15	—	693	164	—	2216
CLPLATEA:16	16	4	81	21	21	28
CLPLATEB:16	16	4	83	20	22	27
CLPLATEC:16	16	4	69	17	21	43
FMINSURF	16	—	64	15	21	22
FMINSRF2:16	16	—	82	20	26	27
HADAMALS:16	16	8	109	26	32	70
LMINSURF	16	12	41	11	11	12
NLMSURF:16	16	12	49	15	14	14
NOBNDTOR:16	16	13	36	9	10	23
POWELLSG:16	16	—	366	89	167	152
TORSION111:16	16	14	22	5	7	15
TORSION1:16	16	14	22	5	7	15
TORSION2:16	16	14	22	5	7	15
TORSIONA:16	16	14	22	6	7	10
TORSIONB:16	16	14	22	6	7	10
TORSIONC:16	16	14	22	5	7	8
TORSIOND:16	16	14	22	5	7	8
TORSION3:16	16	16	7	3	2	9
TORSION4:16	16	16	7	3	2	9
TORSION5:16	16	16	4	2	1	1
TORSION6:16	16	16	4	2	1	1
TORSIONE:16	16	16	4	2	1	4
TORSIONF:16	16	16	4	2	1	4
CHARDIS0:18	18	—	4	2	1	3

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
LINVERSE	19	8	240	280	65	152
CHEBYQAD:20	20	3	127	51	35	57
MANCINO:20	20	—	31	9	8	9
NONDIA:20	20	—	147	46	38	52
POWELLSG:20	20	—	390	96	150	214
POWER:20	20	—	79	31	32	26
POWELLBC:20	20	13	107	25	31	64
TRIDIA:20	20	—	85	21	37	50
NCB20B	21	—	190	46	156	77
NCB20B:22	22	—	254	62	211	231
RAYBENDL:24	24	4	1152	540	—	376
RAYBENDS:24	24	4	3570	1951	—	1166
BIGGSB1	25	3	221	65	92	71
CHNROSNB:25	25	—	383	164	199	127
CHNRSNBM:25	25	—	632	198	234	207
ERRINROS:25	25	—	452	153	—	144
ERRINRSM:25	25	—	1254	294	—	991
HATFLDC	25	12	49	14	19	16
NONSCOMP	25	12	333	86	85	131
OSCIPATH:25	25	—	182	51	60	60
QUARTC	25	—	39	32	10	29
SPMSRTLS	28	—	175	56	61	57
X3PK	30	1	4414	1073	—	—
EIGENCLS:30	30	—	520	125	155	179
MANCINO:30	30	—	32	9	9	9
NONDIA:30	30	—	184	44	49	71
POWER:30	30	—	79	28	33	26
TRIDIA	30	—	129	32	61	74
WATSON:31	31	—	1408	339	1538	—

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
EDENSCH	36	—	70	20	28	22
HADAMALS:36	36	24	192	64	57	101
LIARWHD	36	—	73	28	26	24
POWELLSG:36	36	—	421	103	190	344
CHARDIS0:40	40	—	4	2	1	3
POWELLSG:40	40	—	414	101	185	270
QR3DLS:40	40	1	4330	1067	—	2343
RAYBENDL	44	4	8754	—	—	2841
CLPLATEA	49	7	143	49	63	47
CLPLATEB	49	7	137	47	61	45
CLPLATEC	49	7	288	72	102	180
FMINSRF2:49	49	—	142	38	40	47
FMINSURF:49	49	—	112	31	37	37
LMINSURF:49	49	24	96	33	34	30
MSQRTALS:49	49	—	733	221	—	243
MSQRTBLS:49	49	—	584	144	229	196
NLMSURF:49	49	24	381	116	170	124
ARGLINA:50	50	—	7	2	2	3
ARGLINB:50	50	—	7	4	2	3
ARGLINC:50	50	—	7	4	2	3
BROYDN7D:50	50	—	290	93	133	96
BRYBND:50	50	—	67	19	20	22
BQPGABIM	50	26	119	29	38	53
BQPGASIM	50	27	108	26	34	60
CHNROSNB:50	50	—	730	260	291	242
CHNRSNBM:50	50	—	1013	361	291	336
CRAGGLVY:50	50	—	256	83	94	85
CHEBYQAD:50	50	6	196	132	357	64
CVXBQP1:50	50	50	3	1	1	1
DQDRTIC:50	50	—	23	6	6	38
DQRTIC:50	50	—	43	30	11	32

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
ENGVAL1:50	50	—	60	20	22	19
ERRINROS:50	50	—	445	160	—	146
ERRINRSM:50	50	—	1455	343	2728	1010
FREUROTH:50	50	—	78	19	25	25
HILBERTB:50	50	—	19	5	5	7
INDEFM:50	50	—	202	209	78	65
INDEF:50	50	50	56	74	17	71
MANCINO:50	50	—	37	11	10	10
MOREBV:50	50	—	1539	1588	484	1756
MCCORMCK:50	50	1	56	15	16	31
NCB20B:50	50	—	1024	253	1364	739
NONDIA:50	50	—	145	35	51	90
NONSCOMP:50	50	25	266	79	74	82
NCVXBQP3:50	50	49	34	8	16	16
NCVXBQP1:50	50	50	5	1	8	1
NCVXBQP2:50	50	50	22	5	11	12
PENALTY3	50	—	1179	575	443	378
PENALTY1:50	50	—	234	109	85	74
PENALTY2:50	50	—	482	111	198	161
POWER:50	50	—	91	31	27	30
PROBPENL:50	50	—	8204	1820	—	—
PENTDI:50	50	37	28	8	9	9
SINQUAD:50	50	—	104	25	38	33
SPARSINE:50	50	—	469	117	261	198
SPARSQUR:50	50	—	24	20	6	22
SROSENBR:50	50	—	205	59	53	118
SSBRYBND:50	50	—	5532	1375	—	—
S368:50	50	32	9	15	14	1
TOINTGOR	50	—	396	115	150	130
TOINTPSP	50	—	284	68	188	114

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TOINTQOR	50	—	113	28	53	43
TOINTGSS:50	50	—	135	36	53	44
TQUARTIC:50	50	—	110	26	60	62
TRIDIA:50	50	—	217	54	100	95
VAREIGVL	50	—	64	20	20	21
VARDIM:50	50	—	101	42	29	48
CHARDIS0:60	60	—	4	2	1	3
POWELLSG:60	60	—	432	106	179	331
DECONVU	61	10	3206	793	2652	2698
DECONVB	61	41	483	248	129	—
FMINSRF2	64	—	184	53	49	61
FMINSURF:64	64	—	150	37	40	50
HADAMALS:64	64	34	177	76	54	110
LMINSURF:64	64	28	127	47	40	42
MINSURF	64	28	85	27	24	28
NLMSURF:64	64	28	482	167	185	159
POWER:75	75	—	109	36	37	36
BRATU1D	77	2	1035	293	438	344
POWELLSG:80	80	—	568	139	203	287
DIXMAANA:90	90	—	15	5	4	5
DIXMAANB:90	90	—	19	6	5	6
DIXMAANC:90	90	—	22	7	6	7
DIXMAAND:90	90	—	25	7	7	8
DIXMAANE:90	90	—	158	41	76	52
DIXMAANF:90	90	—	172	43	50	58
DIXMAANG:90	90	—	144	43	48	47
DIXMAANH:90	90	—	172	47	48	56
DIXMAANI:90	90	—	529	132	276	239

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANJ:90	90	—	600	150	181	242
DIXMAANK:90	90	—	653	163	169	254
DIXMAANL:90	90	—	588	147	161	241
DIXMAANM:90	90	—	501	125	254	264
DIXMAANN:90	90	—	720	190	246	239
DIXMAANO:90	90	—	853	216	238	280
DIXMAANP:90	90	—	690	198	245	228
NONDIA:90	90	—	177	41	113	153
ARGLINA:100	100	—	7	2	2	3
ARGLINB:100	100	—	13	3	11	6
ARGLINC:100	100	—	52	10	24	23
ARWHEAD:100	100	—	57	16	19	17
BDQRTIC	100	—	133	39	91	43
BOXPOWER:100	100	—	27	6	8	18
BOX:100	100	—	83	20	24	34
BROWNAL:100	100	—	74	18	30	93
BROYDN7D:100	100	—	415	130	161	138
BRYBND:100	100	—	64	21	21	21
BDEXP	100	2	315	1385	102	—
BIGGSB1:100	100	3	904	401	633	297
CHARDIS0	100	—	4	2	1	3
CHAINWOO:100	100	—	1049	510	280	396
COSINE:100	100	—	946	226	757	—
CRAGGLVY:100	100	—	257	93	111	85
CURLY10:100	100	—	3726	1380	1284	1234
CURLY20:100	100	—	3064	748	2322	1322
CURLY30:100	100	—	2324	568	2749	1322
CHEBYQAD:100	100	4	293	161	1479	96
CLPLATEA:100	100	10	203	69	71	67
CLPLATEB:100	100	10	208	59	66	69
CLPLATEC:100	100	10	705	176	190	319

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
CHENHARK:100	100	30	5420	1698	1985	2302
CVXBP1	100	100	3	1	1	1
DIXON3DQ:100	100	—	405	101	195	339
DQDRTIC:100	100	—	23	6	6	12
DQRTIC:100	100	—	51	44	13	34
ENGVAL1:100	100	—	61	18	24	19
EXTROSNB:100	100	—	4860	2655	2577	1526
FLETBV3M:100	100	—	89	32	25	25
FLETGBV2:100	100	—	660	165	187	297
FLETGBV3:100	100	—	469	1072	2632	146
FLETCHCR:100	100	—	1782	719	629	587
FREUROTH:100	100	—	74	17	35	27
GENHUMPS:100	100	—	1024	326	467	338
GENROSE:100	100	—	1756	716	627	578
HADAMALS:100	100	76	372	146	273	120
HARKERP2	100	100	3	1	1	1
INDEFM:100	100	—	262	113	261	85
INDEF:100	100	100	51	48	16	75
LIARWHD:100	100	—	74	18	26	28
MANCINO:100	100	—	42	14	11	11
MOREBV:100	100	—	9288	2322	—	3838
MSQRTALS:100	100	—	1276	644	869	422
MSQRTBLS:100	100	—	2164	766	989	717
MCCORMCK:100	100	1	56	15	16	21
NONDQUAR	100	—	514	125	301	381
NCB20B:100	100	—	1948	485	3341	1146
NONCVXU2:100	100	—	1483	442	393	512
NONCVXUN:100	100	—	567	143	151	223
NONDIA:100	100	—	369	88	178	161

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
NOBNDTOR:100	100	49	155	37	49	52
NONSCOMP:100	100	50	240	67	62	80
NCVXBQP3:100	100	98	43	10	18	8
NCVXBQP1:100	100	100	5	1	8	1
NCVXBQP2:100	100	100	21	5	10	5
OSCIPTH:100	100	—	228	67	62	79
PENALTY1:100	100	—	217	105	71	69
PENALTY2:100	100	—	265	93	177	88
PENALTY3:100	100	—	2686	1234	884	853
POWELLSG:100	100	—	530	129	168	297
POWER:100	100	—	112	41	33	37
PROBPENL:100	100	—	43	10	—	—
PENTDI:100	100	74	30	9	9	23
QUARTC:100	100	—	51	44	13	34
SCHMVETT:100	100	—	156	58	56	50
SENSORS:100	100	—	85	27	30	25
SINEALI:100	100	—	219	60	192	71
SINQUAD:100	100	—	97	24	28	32
SPARSINE:100	100	—	829	207	382	307
SPARSQUR:100	100	—	27	21	7	23
SPMSRTL:100	100	—	1449	—	368	—
SROSENBR:100	100	—	183	53	46	133
SSBRYBND:100	100	—	10936	2725	—	—
S368:100	100	73	10	11	19	1
TOINTGSS:100	100	—	103	31	42	34
TQUARTIC:100	100	—	218	56	74	71
TRIDIA:100	100	—	341	85	163	175

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSIONA:100	100	54	118	39	35	40
TORSIONB:100	100	54	118	39	35	40
TORSION111:100	100	58	102	32	36	32
TORSION1:100	100	58	102	32	36	32
TORSION2:100	100	58	102	32	36	32
TORSIONC:100	100	67	82	22	24	30
TORSIOND:100	100	67	82	22	24	30
TORSION3:100	100	71	78	19	24	38
TORSION4:100	100	71	78	19	24	38
TORSIONE:100	100	84	50	16	15	22
TORSIONF:100	100	84	50	16	15	22
TORSION5:100	100	86	46	15	14	15
TORSION6:100	100	86	46	15	14	15
VARDIM:100	100	—	122	52	35	52
VAREIGVL:100	100	—	73	21	22	24
WOODS:100	100	—	237	57	112	170
EXPLIN:101	101	95	166	58	42	99
EXPLIN2:101	101	101	5	1	2	5
BRATU1D:103	103	2	1084	385	601	359
EIGENALS	110	—	4266	1412	1220	1408
EIGENBLS	110	—	2141	803	538	773
NCB20:110	110	—	1162	283	—	1039
EXPQUAD	120	7	214	58	55	75
EXPLIN	120	70	543	124	212	179
EXPLIN2	120	101	215	71	59	124
QRTQUAD	120	5	269	59	113	157
QUDLIN:120	120	120	8	2	7	18
FMINSRF2:121	121	—	214	54	57	71
FMINSURF:121	121	—	176	49	48	58
LMINSURF:121	121	40	170	69	55	55
NLMSURF:121	121	40	946	422	381	311

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
HADAMALS:144	144	79	287	134	95	111
HOLMES	180	180	3	1	1	1
NCB20B:180	180	—	1298	531	958	426
DRCV2LQ	196	96	4966	1281	1287	1695
DRCV3LQ	196	96	9829	2715	2525	3671
HADAMALS:196	196	161	468	177	143	168
ARGLINA:200	200	—	7	2	2	3
ARGLINB:200	200	—	28	9	9	6
ARGLINC:200	200	—	23	6	9	4
BROWNAL:200	200	—	75	18	30	139
CHARDIS0:200	200	—	4	2	1	3
MODBEALE:200	200	—	409	101	162	554
PENALTY2:200	200	—	550	—	367	183
PENALTY3:200	200	—	6757	2444	1840	—
POWELLBC:200	200	104	2638	591	2616	865
VARDIM:200	200	—	120	54	34	63
HADAMALS:256	256	135	502	155	151	229
ODC:288	288	148	606	235	330	201
SSC:288	288	148	390	109	125	129
DIXMAANA:300	300	—	15	4	4	5
DIXMAANB:300	300	—	19	6	5	6
DIXMAANC:300	300	—	22	7	6	7
DIXMAAND:300	300	—	25	7	7	8
DIXMAANE:300	300	—	277	69	130	94
DIXMAANF:300	300	—	236	79	79	78

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANG:300	300	—	239	67	76	79
DIXMAANH:300	300	—	233	74	77	77
DIXMAANI:300	300	—	1781	445	1109	773
DIXMAANJ:300	300	—	1452	401	426	480
DIXMAANK:300	300	—	1397	388	418	463
DIXMAANL:300	300	—	1248	395	351	413
DIXMAANM:300	300	—	1761	440	1111	676
DIXMAANN:300	300	—	1904	507	476	709
DIXMAANO:300	300	—	1952	504	488	694
DIXMAANP:300	300	—	1868	467	487	781
HADAMALS:324	324	256	499	251	160	184
CHARDIS0:400	400	—	4	3	1	3
HADAMALS:400	400	306	545	361	320	178
JNLBRNG1:400	400	253	274	78	173	90
JNLBRNGA:400	400	253	317	118	164	103
JNLBRNG2:400	400	278	295	103	120	96
JNLBRNGB:400	400	302	399	99	188	138
OBSTCLBL:400	400	263	28	19	9	28
OBSTCLBM:400	400	263	28	19	9	28
OBSTCLBU:400	400	263	28	19	9	28
OBSTCLAE:400	400	398	9	2	7	8
OBSTCLAL:400	400	398	9	2	7	8
EIGENCLS	462	—	7080	1761	3119	2501
NOBNDTOR:484	484	143	192	82	93	62
TORSIONA:484	484	161	202	84	73	64
TORSIONB:484	484	161	202	84	73	64
TORSION111:484	484	186	184	70	115	60
TORSION1:484	484	186	184	70	115	60
TORSION2:484	484	186	184	70	115	60
TORSIONC:484	484	254	154	48	53	49
TORSIOND:484	484	254	154	48	53	49
TORSION3:484	484	267	193	45	58	61

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSION4:484	484	267	193	45	58	61
TORSIONE:484	484	362	107	37	40	34
TORSIONF:484	484	362	107	37	40	34
TORSION5:484	484	368	116	39	40	36
TORSION6:484	484	368	116	39	40	36
ARWHEAD:500	500	—	68	15	18	26
BDQRTIC:500	500	—	148	36	153	64
BROYDN7D:500	500	—	538	185	201	179
BRYBND:500	500	—	64	21	21	21
BDEXP:500	500	2	1514	—	504	—
CRAGGLVY:500	500	—	290	93	121	96
DQRTIC	500	—	59	64	15	41
DQDRTIC:500	500	—	23	6	6	14
FREUROTH:500	500	—	96	21	28	40
GENHUMPS:500	500	—	953	396	440	315
GENROSE:500	500	—	8466	3581	2254	2792
HARKERP2:500	500	500	3	1	1	1
LIARWHD:500	500	—	99	22	47	33
MOREBV:500	500	—	1489	409	1068	494
MCCORMCK:500	500	1	56	16	16	23
NCB20B:500	500	—	1055	259	983	460
NONDIA:500	500	—	663	154	327	300
NONDQUAR:500	500	—	569	138	275	314
NONSCOMP:500	500	250	266	69	74	82
OSCIPATH:500	500	—	211	53	61	68
PENALTY1:500	500	—	169	58	60	54
POWELLSG:500	500	—	645	158	193	296
POWER:500	500	—	255	67	69	84
PROBPENL:500	500	—	7	2	2	3
PENTDI:500	500	376	28	8	8	9

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
QUARTC:500	500	—	59	64	15	41
SCHMVETT:500	500	—	159	358	69	51
SINQUAD:500	500	—	155	41	45	62
SROSENBR:500	500	—	270	63	72	126
TOINTGSS:500	500	—	109	27	39	34
TQUARTIC:500	500	—	481	120	123	155
TRIDIA:500	500	—	857	214	421	441
VAREIGVL:500	500	—	73	23	22	24
BRATU1D:503	503	2	6081	—	6170	2015
CLPLATEA:529	529	23	552	161	183	183
CLPLATEB:529	529	23	428	130	142	142
CLPLATEC:529	529	23	1972	493	—	2728
ODC	864	164	576	170	217	191
SSC	864	164	397	110	193	131
FMINSRF2:961	961	—	271	144	78	89
FMINSURF:961	961	—	331	82	106	125
LMINSURF:961	961	120	607	320	208	200
NLMSURF:961	961	120	4301	1858	1627	1424
ARWHEAD:1000	1000	—	64	16	17	28
BDQRTIC:1000	1000	—	171	41	150	106
BOXPOWER:1000	1000	—	42	10	12	23
BOX:1000	1000	—	141	38	40	66
BROWNAL:1000	1000	—	107	25	30	57

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
BROYDN7D:1000	1000	—	526	224	212	175
BRYBND:1000	1000	—	64	22	21	21
BDEXP:1000	1000	2	3017	—	1005	—
BIGGSB1:1000	1000	3	7917	2545	5961	2619
CHAINWOO	1000	—	903	223	306	409
CURLY10	1000	—	25995	—	8801	8622
CHARDIS0:1000	1000	—	4	3	1	3
CRAGGLVY:1000	1000	—	271	90	125	90
CVXBQP1:1000	1000	1000	3	1	1	1
DIXON3DQ:1000	1000	—	4005	1001	1995	3685
DQDRTIC:1000	1000	—	23	6	6	18
DQRTIC:1000	1000	—	63	62	16	43
EG2	1000	—	428	100	195	208
ENGVAL1:1000	1000	—	66	21	21	20
EXTROSNB:1000	1000	—	4970	4220	2677	1563
FLETBV3M:1000	1000	—	52	37	15	23
FLETGBV2:1000	1000	—	4009	1002	3679	2136
FLETGBV3:1000	1000	—	14177	—	—	4680
FLETCHCR:1000	1000	—	16834	7212	4327	5555
FREUROTH:1000	1000	—	76	21	28	23
GENHUMPS	1000	—	1097	331	411	362
HARKERP2:1000	1000	1000	3	1	1	1
INDEFM	1000	—	558	—	194	179
INDEF	1000	1000	53	44	16	101
JNLBRNG1:1000	1000	366	278	90	159	92
JNLBRNGA:1000	1000	385	329	128	198	109
JNLBRNG2:1000	1000	524	505	175	303	166

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
JNLBRNGB:1000	1000	560	1347	361	742	447
LIARWHD:1000	1000	—	108	25	35	48
MOREBV:1000	1000	—	1468	563	1165	488
MCCORMCK:1000	1000	1	59	16	18	19
NONCVXU2	1000	—	5407	1349	1512	2554
NONCVXUN	1000	—	10021	4200	2904	—
NONDIA	1000	—	1340	421	569	422
NCB20B:1000	1000	—	1244	300	956	500
NONDQUAR:1000	1000	—	618	149	190	255
NONSCOMP:1000	1000	500	274	64	72	84
NCVXBQP3	1000	983	93	22	34	20
NCVXBQP2	1000	993	80	21	25	14
NCVXBQP1	1000	1000	5	1	8	1
OSCIGRAD:1000	1000	—	1486	—	473	—
OBSTCLBL	1000	680	170	50	54	65
OBSTCLBM	1000	680	170	50	54	65
OBSTCLBU	1000	680	170	50	54	65
OBSTCLAL	1000	696	72	39	21	31
OBSTCLAE:1000	1000	696	72	39	21	31
PENALTY1:1000	1000	—	151	71	48	48
POWELLSG:1000	1000	—	575	140	244	319
POWER:1000	1000	—	348	96	95	114
POWELLBC:1000	1000	501	10829	—	—	3570
PENTDI	1000	751	25	8	8	8
QUARTC:1000	1000	—	63	62	16	43
SPARSINE	1000	—	17332	4333	7701	5883
SPARSQUR	1000	—	31	25	8	24
SSBRYBND	1000	—	20657	5160	—	7529

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SCHMVETT:1000	1000	—	185	110	65	59
SENSORS:1000	1000	—	111	64	59	32
SINEALI:1000	1000	—	192	69	163	62
SINQUAD:1000	1000	—	145	36	55	46
SROSENBR:1000	1000	—	278	65	91	164
TESTQUAD	1000	—	4056	1014	—	4611
TOINTGSS:1000	1000	—	99	34	35	32
TQUARTIC:1000	1000	—	291	68	178	175
TRIDIA:1000	1000	—	1237	309	613	715
VAREIGVL:1000	1000	—	73	23	22	24
WOODS:1000	1000	—	335	80	114	181
BRATU1D:1003	1003	1003	20170	—	—	6664
NCB20	1010	—	556	137	6416	361
CLPLATEA:1024	1024	32	870	271	311	287
CLPLATEB:1024	1024	32	529	153	159	174
CLPLATEC:1024	1024	32	3652	913	—	7045
FMINSRF2:1024	1024	—	283	83	84	94
FMINSURF:1024	1024	—	370	103	101	123
HADAMALS:1024	1024	801	583	689	498	191
LMINSURF:1024	1024	124	662	323	225	220
NLMSURF	1024	124	4388	1776	1777	1457
NOBNDTOR:1024	1024	235	319	99	171	102
TORSIONA:1024	1024	281	278	159	131	90
TORSIONB:1024	1024	281	278	159	131	90
TORSION111:1024	1024	323	242	136	160	79
TORSION1:1024	1024	323	242	136	160	79

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSION2:1024	1024	323	242	136	160	79
TORSIONC:1024	1024	493	153	65	80	50
TORSIOND:1024	1024	493	153	65	80	50
TORSION3:1024	1024	515	185	66	104	58
TORSION4:1024	1024	515	185	66	104	58
TORSIONE:1024	1024	761	160	42	56	51
TORSIONF:1024	1024	761	160	42	56	51
TORSION5:1024	1024	768	157	52	57	49
TORSION6:1024	1024	768	157	52	57	49
EXPQUAD:1200	1200	81	714	156	358	346
EXPLIN:1200	1200	1150	490	111	213	197
EXPLIN2:1200	1200	1181	197	70	58	116
QRTQUAD:1200	1200	50	1309	280	2075	2001
QUDLIN:1200	1200	1200	11	2	10	38
DIXMAANA:1500	1500	—	15	4	4	5
DIXMAANB:1500	1500	—	19	6	5	6
DIXMAANC:1500	1500	—	22	7	6	7
DIXMAAND:1500	1500	—	25	7	7	8
DIXMAANE:1500	1500	—	557	138	283	184
DIXMAANF:1500	1500	—	461	133	137	153
DIXMAANG:1500	1500	—	431	130	122	143
DIXMAANH:1500	1500	—	395	117	133	131
DIXMAANI:1500	1500	—	5665	1504	3661	1876
DIXMAANJ:1500	1500	—	2451	839	614	850
DIXMAANK:1500	1500	—	2325	581	739	790
DIXMAANL:1500	1500	—	1010	448	548	335

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANM:1500	1500	—	5348	1658	3635	1764
DIXMAANN:1500	1500	—	2478	887	751	819
DIXMAANO:1500	1500	—	2290	784	672	755
DIXMAANP:1500	1500	—	1963	796	736	649
CHARDIS0:2000	2000	—	4	3	1	3
EDENSCH:2000	2000	—	75	22	32	23
MODBEALE:2000	2000	—	495	123	194	636
NCB20B:2000	2000	—	1176	718	838	391
BQPGAUSS	2003	134	16618	8220	10926	5436
JNLBRNG1:2300	2300	809	348	123	189	114
JNLBRNGA:2300	2300	847	396	136	239	130
JNLBRNGB:2300	2300	1052	1772	433	1040	622
JNLBRNG2:2300	2300	1077	623	196	414	206
OBSTCLBL:2300	2300	993	299	78	103	96
OBSTCLBM:2300	2300	993	299	78	103	96
OBSTCLBU:2300	2300	993	299	78	103	96
OBSTCLAE:2300	2300	1276	176	65	79	58
OBSTCLAL:2300	2300	1276	176	65	79	58
ODC:2376	2376	206	608	169	259	202
SSC:2376	2376	206	352	88	174	125
EIGENBLS:2550	2550	—	27925	—	7519	9258
EIGENCLS:2652	2652	—	44261	—	—	14634
DIXMAANA:3000	3000	—	15	4	4	5
DIXMAANB:3000	3000	—	19	6	5	6
DIXMAANC:3000	3000	—	22	7	6	7
DIXMAAND:3000	3000	—	25	7	7	8
DIXMAANE:3000	3000	—	715	185	431	236

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANF:3000	3000	—	592	165	149	197
DIXMAANG:3000	3000	—	517	148	151	171
DIXMAANH:3000	3000	—	508	143	140	168
DIXMAANI:3000	3000	—	3768	1353	3261	1246
DIXMAANJ:3000	3000	—	932	1179	489	308
DIXMAANK:3000	3000	—	714	366	505	236
DIXMAANL:3000	3000	—	1169	898	421	388
DIXMAANM:3000	3000	—	3679	1414	2825	1213
DIXMAANN:3000	3000	—	3220	1019	853	1062
DIXMAANO:3000	3000	—	2603	821	743	863
DIXMAANP:3000	3000	—	2042	667	1203	675
JNLBRNG1:3200	3200	1130	378	132	179	124
JNLBRNGA:3200	3200	1168	433	172	251	143
JNLBRNG2:3200	3200	1400	723	231	500	239
JNLBRNGB:3200	3200	1446	2217	547	1350	1064
OBSTCLBL:3200	3200	1252	254	71	99	81
OBSTCLBM:3200	3200	1252	254	71	99	81
OBSTCLBU:3200	3200	1252	254	71	99	81
OBSTCLAE:3200	3200	1813	228	81	104	73
OBSTCLAL:3200	3200	1813	228	81	104	73
JNLBRNG1:3400	3400	1195	446	128	177	146
JNLBRNGA:3400	3400	1233	448	158	206	147
JNLBRNG2:3400	3400	1500	689	225	411	229
JNLBRNGB:3400	3400	1545	2259	560	1566	1110
CHAINWOO:4000	4000	—	994	986	469	325
CHARDIS0:4000	4000	—	4	3	1	3
WOODS:4000	4000	—	355	85	190	298
HADAMALS:4096	4096	3282	795	1163	2208	261

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
ARWHEAD:5000	5000	—	100	38	28	45
BDQRTIC:5000	5000	—	175	40	162	251
BROYDN7D:5000	5000	—	628	276	234	209
BRYBND:5000	5000	—	64	22	21	21
BIGGSB1:5000	5000	3	37586	13091	13033	12709
BDEXP:5000	5000	5000	3	1	1	1
CRAGGLVY:5000	5000	—	302	90	147	99
CHENHARK:5000	5000	2010	27965	6588	—	17397
DQDRTIC:5000	5000	—	23	6	6	18
DQRTIC:5000	5000	—	71	104	18	49
ENGVAL1:5000	5000	—	63	19	25	19
FLETBV3M:5000	5000	—	89	—	25	34
FLETCBV2:5000	5000	—	20005	5001	13395	8054
FREUROTH:5000	5000	—	90	22	28	27
GENHUMPS:5000	5000	—	931	357	368	306
HARKERP2:5000	5000	5000	3	1	1	1
INDEFM:5000	5000	—	247	—	75	203
INDEF:5000	5000	5000	56	542	17	—
LIARWHD:5000	5000	—	141	42	37	73
MOREBV:5000	5000	—	1358	563	1167	451
MCCORMCK:5000	5000	1	62	18	20	18
NCB20B:5000	5000	—	1316	313	1537	438
NONCVXU2:5000	5000	—	21643	5381	6455	13814
NONCVXUN:5000	5000	—	27482	6716	—	—
NONDIA:5000	5000	—	1910	440	1005	—

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
NONDQUAR:5000	5000	—	766	184	239	404
NONSCOMP:5000	5000	2500	264	70	77	84
POWELLSG:5000	5000	—	659	162	201	346
POWER:5000	5000	—	759	206	207	251
PENTDI:5000	5000	3751	28	9	8	9
QUARTC:5000	5000	—	71	104	18	49
QRTQUAD:5000	5000	549	30762	6580	11658	—
QUDLIN:5000	5000	5000	12	2	9	13
SCHMVETT:5000	5000	—	167	223	80	53
SINQUAD:5000	5000	—	137	61	52	43
SPARSQUR:5000	5000	—	35	22	9	31
SROSENB:5000	5000	—	624	197	159	241
SSBRYBND:5000	5000	—	25562	6902	15416	8475
TESTQUAD:5000	5000	—	4948	1237	14183	6238
TOINTGSS:5000	5000	—	118	34	32	40
TQUARTIC:5000	5000	—	686	194	292	217
TRIDIA:5000	5000	—	2829	707	1411	1466
VAREIGVL:5000	5000	—	73	23	22	24
NCB20:5010	5010	—	633	168	1524	205
CLPLATEA:5041	5041	71	2190	1060	925	722
CLPLATEB:5041	5041	71	866	215	375	367
CLPLATEC:5041	5041	71	15872	3968	—	—
ODC:5184	5184	284	627	188	307	208
SSC:5184	5184	284	381	95	220	155
MINSURFO:5306	5306	1762	3937	951	1044	2261
NOBNDTOR:5476	5476	801	662	265	375	219

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSIONA:5476	5476	1096	704	179	451	230
TORSIONB:5476	5476	1096	704	179	451	230
TORSION111:5476	5476	1219	613	260	496	201
TORSION1:5476	5476	1219	613	260	496	201
TORSION2:5476	5476	1219	613	260	496	201
TORSIONC:5476	5476	2328	422	110	131	136
TORSIOND:5476	5476	2328	422	110	131	136
TORSION3:5476	5476	2386	470	135	137	156
TORSION4:5476	5476	2386	470	135	137	156
TORSIONE:5476	5476	3782	218	79	66	117
TORSIONF:5476	5476	3782	218	79	66	117
TORSION5:5476	5476	3805	292	75	140	95
TORSION6:5476	5476	3805	292	75	140	95
FMINSRF2:5625	5625	—	525	157	160	173
FMINSURF:5625	5625	—	540	159	160	177
LMINSURF:5625	5625	296	1579	904	627	525
NLMSURF:5625	5625	296	15218	6483	5388	5035
ODC:7344	7344	344	729	224	394	242
SSC:7344	7344	344	560	140	260	188
JNLBRNG1:7500	7500	2605	992	237	382	322
JNLBRNGA:7500	7500	2676	959	276	451	316
JNLBRNG2:7500	7500	3171	1375	437	863	452
JNLBRNGB:7500	7500	3395	3265	802	2402	2236
OBSTCLBL:7500	7500	2859	401	126	173	129
OBSTCLBM:7500	7500	2859	401	126	173	129
OBSTCLBU:7500	7500	2859	401	126	173	129
OBSTCLAE	7500	3819	434	166	212	144
OBSTCLAL:7500	7500	3819	434	166	212	144
DIXMAANA:9000	9000	—	15	4	4	5
DIXMAANB:9000	9000	—	19	6	5	6
DIXMAANC:9000	9000	—	22	7	6	7

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAAND:9000	9000	—	25	8	7	8
DIXMAANE:9000	9000	—	956	286	593	315
DIXMAANF:9000	9000	—	788	239	220	260
DIXMAANG:9000	9000	—	804	226	221	265
DIXMAANH:9000	9000	—	750	215	216	248
DIXMAANI:9000	9000	—	1384	1022	1697	458
DIXMAANJ:9000	9000	—	828	375	259	273
DIXMAANK:9000	9000	—	582	597	237	192
DIXMAANL:9000	9000	—	651	641	220	216
DIXMAANM:9000	9000	—	1680	1020	2385	553
DIXMAANN:9000	9000	—	1806	979	537	595
DIXMAANO:9000	9000	—	2102	1078	651	690
DIXMAANP:9000	9000	—	2219	854	754	730
BOXPOWER	10000	—	27	8	8	31
BOX	10000	—	143	34	60	105
BROYDN7D:10000	10000	—	589	418	228	196
BRYBND:10000	10000	—	64	22	21	21
CHAINWOO:10000	10000	—	1083	266	657	440
CVXBQP1:10000	10000	10000	3	1	1	1
DIXON3DQ:10000	10000	—	40009	10002	19997	25087
FLETBV3M:10000	10000	—	74	—	22	20
FLETCBV2:10000	10000	—	37579	—	20005	12372
FMINSRF2:10000	10000	—	684	195	206	227
FMINSURF:10000	10000	—	667	197	206	221
HARKERP2:10000	10000	10000	3	1	1	1
INDEFM:10000	10000	—	304	67	455	185

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
JNLBRNG1:10000	10000	3443	1304	342	429	428
JNLBRNGA:10000	10000	3568	1434	460	739	472
JNLBRNG2:10000	10000	4209	1812	483	1324	602
JNLBRNGB:10000	10000	4484	4824	1191	3142	2739
LIARWHD:10000	10000	—	129	30	42	60
LMINSURF:10000	10000	396	2289	1132	874	762
MCCORMCK:10000	10000	1	53	18	19	15
NONCVXU2:10000	10000	—	28906	7794	7618	13751
NONCVXUN:10000	10000	—	21612	5236	—	—
NONDIA:10000	10000	—	2888	726	1939	936
NONDQUAR:10000	10000	—	968	233	290	415
NLMSURF:10000	10000	396	23680	—	7504	7838
NOBNDTOR:10000	10000	1299	993	336	666	328
NONSCOMP:10000	10000	5000	237	69	60	88
NCVXBQP3:10000	10000	9808	196	55	91	36
NCVXBQP2:10000	10000	9934	127	71	77	13
NCVXBQP1:10000	10000	10000	5	1	8	1
OSCIGRAD:10000	10000	—	5459	—	1737	—
OBSTCLBL:10000	10000	3896	480	126	236	157
OBSTCLBM:10000	10000	3896	480	126	236	157
OBSTCLBU:10000	10000	3896	480	126	236	157
OBSTCLAE:10000	10000	5061	456	163	223	150
OBSTCLAL:10000	10000	5061	456	163	223	150
POWELLSG:10000	10000	—	590	144	202	386
POWER:10000	10000	—	1012	289	294	334
QUARTC:10000	10000	—	75	106	19	51
SCHMVETT:10000	10000	—	174	281	71	55
SINQUAD:10000	10000	—	197	54	68	63
SPARSQUR:10000	10000	—	39	29	10	24

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SROSENB:10000	10000	—	881	294	274	280
TOINTGSS:10000	10000	—	113	33	31	44
TQUARTIC:10000	10000	—	1129	275	340	357
TRIDIA:10000	10000	—	4021	1005	2003	2505
TORSIONA:10000	10000	1839	935	263	407	306
TORSIONB:10000	10000	1839	935	263	407	306
TORSION111:10000	10000	2013	954	226	593	414
TORSION1:10000	10000	2013	954	226	593	414
TORSION2:10000	10000	2013	954	226	593	414
TORSIONC:10000	10000	4105	615	152	343	202
TORSIOND:10000	10000	4105	615	152	343	202
TORSION3:10000	10000	4189	566	161	164	220
TORSION4:10000	10000	4189	566	161	164	220
TORSIONE:10000	10000	6685	351	92	104	129
TORSIONF:10000	10000	6685	351	92	104	129
TORSION5:10000	10000	6720	334	106	100	135
TORSION6:10000	10000	6720	334	106	100	135
WOODS:10000	10000	—	540	197	232	177
JNLBRNG1:12500	12500	4277	1506	354	533	643
JNLBRNGA:12500	12500	4469	1531	457	856	502
JNLBRNG2:12500	12500	5197	2422	662	1461	799
JNLBRNGB:12500	12500	5630	5603	1381	4425	3815
OBSTCLBL:12500	12500	4623	618	152	205	203
OBSTCLBM:12500	12500	4623	618	152	205	203
OBSTCLBU:12500	12500	4623	618	152	205	203

problem	dim	nact	nf2g best	ng for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
OBSTCLAE:12500	12500	6481	652	158	296	213
OBSTCLAL:12500	12500	6481	652	158	296	213
ODC:14544	14544	544	1705	521	682	567
SSC:14544	14544	544	949	240	540	312
NOBNDTOR:14884	14884	1758	1413	438	1132	467
TORSIONA:14884	14884	2618	1014	303	745	335
TORSIONB:14884	14884	2618	1014	303	745	335
TORSION111:14884	14884	2830	1130	341	1123	371
TORSION1:14884	14884	2830	1130	341	1123	371
TORSION2:14884	14884	2830	1130	341	1123	371
TORSIONC:14884	14884	6034	903	212	277	299
TORSIOND:14884	14884	6034	903	212	277	299
TORSION3:14884	14884	6137	716	179	274	236
TORSION4:14884	14884	6137	716	179	274	236
TORSIONE:14884	14884	9868	411	108	124	164
TORSIONF:14884	14884	9868	411	108	124	164
TORSION5:14884	14884	9914	544	127	194	191
TORSION6:14884	14884	9914	544	127	194	191
FMINSRF2:15625	15625	—	794	220	247	263
FMINSURF:15625	15625	—	779	228	247	258
LMSURF:15625	15625	496	2854	1546	1135	951
NLMSURF:15625	15625	496	32574	—	13667	10777
BOXPOWER:20000	20000	—	30	10	9	15
MODBEALE:20000	20000	—	651	162	219	554
MCCORMCK:50000	50000	1	54	18	20	15
BOX:100000	100000	—	226	52	117	245
INDEFM:100000	100000	—	898	—	266	738
OSCIGRAD:100000	100000	—	2578	—	835	—
DEGDIAG:100001	100001	100001	3	1	1	1
DEGTRID2:100001	100001	100001	3	1	1	1

3.10 Number of functions evaluations, accuracy 1e-06

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
BQP1VAR	1	1	3	1	1	1
AKIVA	2	—	70	47	37	26
BEALE	2	—	49	32	25	17
BRKMCC	2	—	27	17	13	12
CAMEL6	2	—	25	33	18	9
CLIFF	2	—	73	88	69	25
CUBE	2	—	114	86	69	40
CHEBYQAD:2	2	—	38	33	21	14
DENSCHNA	2	—	28	19	15	10
DENSCHNB	2	—	28	17	19	10
DENSCHNC	2	—	40	30	23	14
DENSCHNF	2	—	36	25	23	14
DJTL	2	—	270	168	438	—
ENGVAL1	2	—	25	19	14	9
EXPFIT	2	—	53	30	28	19
FREUROTH	2	—	43	38	21	19
HUMPS	2	—	135	106	131	47
HAIRY	2	—	58	50	44	22
HIMMELBB	2	—	22	23	16	8
HIMMELBG	2	—	35	19	17	14
HIMMELBH	2	—	22	15	15	8
HS1	2	—	104	59	54	36
HS5	2	—	26	21	13	10
HILBERTA:2	2	—	11	7	5	10
HIMMELP1	2	1	22	29	10	8
HS2	2	1	32	19	14	13
HS3MOD	2	1	4	16	2	6
HS3	2	1	4	9	2	4
HS4	2	2	3	1	1	1
JENSMP	2	—	152	142	62	—
LOGHAIRY	2	—	74	44	53	31

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
LOGROS	2	—	182	210	98	64
MARATOSB	2	—	3169	2586	2828	1135
MEXHAT	2	—	330	231	243	112
MODBEALE	2	—	49	32	25	17
MDHOLE	2	1	9	5	3	4
OSCIGRAD:2	2	—	5382	3358	—	1944
OSCIPATH:2	2	—	202	148	146	70
ROSENBR	2	—	103	53	57	36
S308	2	—	28	17	17	10
SINEVAL	2	—	47	25	21	17
SISSER	2	—	35	32	17	18
SNAIL	2	—	25	17	13	9
SENSORS:2	2	—	31	17	13	14
SIMBQP	2	1	4	5	2	4
SIM2BQP	2	2	3	1	1	1
ZANGWIL2	2	—	11	7	5	10
BARD	3	—	174	142	82	104
BOX3	3	—	23	18	11	10
BOX2	3	1	113	71	55	97
DENSCHND	3	—	64	32	45	30
DENSCHNE	3	—	27	28	13	10
ENGVAL2	3	—	107	67	53	44
EG1	3	1	81	50	37	31
GROWTHLS	3	—	94	50	82	38
GULF	3	—	4	14	2	64
HATFLDD	3	—	71	68	35	45
HATFLDE	3	—	74	45	59	26
HATFLDFL	3	—	405	1284	280	151
HELIX	3	—	43	23	21	21
HIELOW	3	—	74	54	37	26
HS25	3	—	8	4	13	148
KOEBHELB	3	—	195	138	79	—

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
MEYER3	3	—	876	518	1298	—
PFIT1LS	3	—	52	26	—	—
PFIT2LS	3	—	52	26	—	—
PFIT3LS	3	—	52	26	—	—
PFIT4LS	3	—	52	26	—	—
SCHMVETT	3	—	54	42	24	24
SENSORS:3	3	—	97	81	46	33
SPECAN:3	3	3	3	1	1	1
WEEDS	3	1	72	60	116	30
YFIT	3	—	225	298	95	134
YFITU	3	—	364	216	205	134
ALLINITU	4	—	31	33	17	11
ALLINIT	4	2	41	30	21	15
BROWNDEN	4	—	72	41	34	31
CRAGGLVY	4	—	134	119	73	46
CHAINWOO:4	4	—	98	62	46	39
CHEBYQAD:4	4	—	48	115	46	18
HATFLDA	4	—	67	94	51	23
HIMMELBF	4	—	293	183	125	141
HS38	4	—	102	60	48	39
HILBERTA:4	4	—	19	11	9	25
HATFLDB	4	1	109	87	49	53
HADAMALS	4	3	37	20	15	18
KOWOSB	4	—	188	102	92	106
MSQRTALS	4	—	63	46	31	23
MODBEALE:4	4	—	76	40	49	35
PENALTY2	4	—	1538	1765	747	538
POWELLSG	4	—	120	69	58	42
PALMER1B	4	—	29	17	164	74
PALMER2B	4	—	31	19	158	81
PALMER3B	4	—	26	16	174	37
PALMER4B	4	—	31	19	131	51

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
PALMER5D	4	—	21	11	10	34
PENALTY1:4	4	—	391	381	183	141
PSPDOC	4	1	25	13	14	13
PALMER1	4	1	116	74	131	46
PALMER2	4	1	79	60	53	31
PALMER3	4	1	77	74	41	31
PALMER4	4	1	91	69	46	35
POWELLBC:4	4	4	4	3	2	2
SINEALI:4	4	—	270	152	150	96
WOODS:4	4	—	102	57	48	39
CHEBYQAD:5	5	2	61	65	30	23
EXTROSNB	5	—	322	316	185	116
GENHUMPS:5	5	—	254	183	152	90
GENROSE:5	5	—	137	120	82	47
HILBERTB	5	—	19	11	9	7
HILBERTA:5	5	—	23	13	11	56
HS45	5	5	3	1	1	1
OSBORNEA	5	5	28	16	—	—
OSCIGRAD:5	5	—	5142	2814	2437	—
SINQUAD	5	—	50	30	30	18
TQUARTIC	5	—	54	37	32	20
BIGGS6	6	—	494	4315	232	733
BIGGS5	6	1	216	263	109	76
BIGGS3	6	3	76	63	36	26
CHEBYQAD:6	6	2	62	81	26	35
EIGENALS:6	6	—	109	67	61	39
EIGENBLS:6	6	—	101	72	73	35
HEART6LS	6	—	3316	3034	1500	1388
HILBERTA:6	6	—	23	13	11	51
HART6	6	2	59	33	30	22
PALMER6A	6	—	33	19	786	649

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
PALMER7A	6	—	37	21	—	—
PALMER8A	6	—	33	19	263	111
PALMER1A	6	—	45	25	472	416
PALMER2A	6	—	45	25	323	398
PALMER3A	6	—	33	19	588	284
PALMER4A	6	—	33	19	382	218
PALMER5C	6	—	27	15	13	21
SPECAN:6	6	6	3	1	1	1
CHEBYQAD:7	7	1	107	125	45	58
PALMER1D	7	—	33	17	19	—
AIRCRAFTB	8	3	250	258	234	88
CHEBYQAD:8	8	2	96	190	46	64
HEART8LS	8	—	688	1664	2314	246
MAXLIKA	8	7	8	4	8	42
OSLBQP	8	7	4	6	3	2
PALMER6C	8	—	37	19	24	—
PALMER6E	8	—	70	629	38	2331
PALMER7C	8	—	37	19	24	—
PALMER8C	8	—	37	19	18	—
PALMER8E	8	—	84	372	40	2402
PALMER1C	8	—	37	19	27	—
PALMER1E	8	—	1295	1295	607	—
PALMER2C	8	—	37	19	26	—
PALMER3C	8	—	37	19	19	—
PALMER4C	8	—	37	19	19	—
PALMER4E	8	—	1045	555	1501	—
PALMER5A	8	—	41	23	—	—
POWELLSG:8	8	—	203	139	101	110
PALMER7E	8	1	9017	4843	—	—
PALMER2E	8	1	2136	1130	—	—
PALMER3E	8	1	2093	1105	—	—

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
S368:8	8	6	34	18	14	41
VIBRBEAM	8	—	2753	1541	—	—
CHEBYQAD:9	9	2	98	166	42	75
MSQRTBLS	9	—	100	68	56	34
NONMSQRT	9	—	833	2781	389	—
SPECAN:9	9	9	3	1	1	1
ARGLINA:10	10	—	7	5	3	6
ARGLINB:10	10	—	7	7	3	7
ARGLINC:10	10	—	7	7	3	8
BROWNAL	10	—	75	39	37	38
BRYBND	10	—	269	357	131	103
BOXPOWER:10	10	—	21	11	17	16
BOX:10	10	—	41	21	23	18
BROYDN7D:10	10	—	94	92	56	32
CHNROSNB	10	—	217	178	111	75
CHNRSNBM	10	—	231	191	116	81
CHARDIS0:10	10	—	4	5	2	4
COSINE:10	10	—	102	52	58	56
CRAGGLVY:10	10	—	133	88	66	45
CHEBYQAD	10	2	63	177	29	60
CHENHARK:10	10	3	61	35	35	21
CVXBQP1:10	10	10	3	1	1	1
DIXON3DQ	10	—	45	23	17	30
DQDRTIC	10	—	23	13	11	21
DQRTIC:10	10	—	83	67	50	31
ERRINROS:10	10	—	370	278	176	138
ERRINRSM:10	10	—	777	567	371	445
EXTROSNB:10	10	—	3234	3336	1556	1254
FLETBV3M	10	—	37	36	21	21
FLETBV2	10	—	47	25	23	22
FLETBV3	10	—	67	81	48	33

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
FLETCHBV	10	—	112	94	112	52
FLETCHCR	10	—	229	200	125	79
FREUROTH:10	10	—	74	38	35	33
GENHUMPS:10	10	—	480	451	346	174
GENROSE:10	10	—	232	204	121	82
HS110	10	—	35	51	15	—
HILBERTA:10	10	—	23	13	11	62
HILBERTB:10	10	—	19	11	9	7
HARKERP2:10	10	10	3	1	1	1
INDEFM:10	10	—	126	66	68	62
INDEF:10	10	10	53	175	19	73
MOREBV	10	—	71	43	35	50
MANCINO:10	10	—	26	15	13	10
MODBEALE:10	10	—	146	76	77	269
MCCORMCK	10	1	54	34	24	34
NONCVXU2:10	10	—	75	61	45	27
NONCVXUN:10	10	—	71	37	39	28
NONDIA:10	10	—	106	69	64	36
NCVXBQP1:10	10	10	8	4	12	11
NCVXBQP2:10	10	10	5	3	10	9
NCVXBQP3:10	10	10	8	4	13	90
POWER	10	—	67	49	33	23
PENALTY1:10	10	—	313	237	174	109
PENALTY2:10	10	—	1469	1165	852	533
PROBPENL:10	10	4	827	477	327	1524
POWELLBC:10	10	7	17	32	33	15
RAYBENDL:10	10	4	90	63	42	34
RAYBENDS:10	10	4	154	115	109	58
SINEALI	10	—	3666	3485	1770	1334
SROSENBR	10	—	169	89	89	115

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SCHMVETT:10	10	—	90	53	42	35
SENSORS:10	10	—	60	32	49	28
SPARSINE:10	10	—	53	27	31	39
SPARSQUR:10	10	—	34	37	14	23
SSBRYBND:10	10	—	737	461	335	3432
SSCOSINE:10	10	—	372	200	205	—
TOINTGSS	10	—	108	58	62	54
TQUARTIC:10	10	—	82	62	40	30
TRIDIA:10	10	—	45	23	17	29
VARDIM	10	—	67	63	33	31
VAREIGVL:10	10	—	46	31	27	16
OSBORNEB	11	—	3847	—	—	1421
EXPQUAD:12	12	4	118	119	52	72
QRTQUAD:12	12	3	223	135	110	167
QUDLIN	12	12	8	4	7	17
WATSON:12	12	—	238	166	116	116
BRATU1D:13	13	2	65	35	34	36
DIXMAANA	15	—	19	13	9	7
DIXMAANB	15	—	19	13	9	7
DIXMAANC	15	—	19	15	11	7
DIXMAAND	15	—	25	15	13	9
DIXMAANE	15	—	61	33	35	21
DIXMAANF	15	—	61	33	41	21
DIXMAANG	15	—	64	33	43	22
DIXMAANH	15	—	61	33	43	21
DIXMAANI	15	—	113	57	93	47
DIXMAANJ	15	—	124	62	97	44

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANK	15	—	133	67	99	46
DIXMAANL	15	—	113	57	97	44
DIXMAANM	15	—	93	47	67	53
DIXMAANN	15	—	113	57	89	47
DIXMAANO	15	—	115	59	103	39
DIXMAANP	15	—	131	77	95	45
PARKCH	15	—	693	365	—	2355
CLPLATEA:16	16	4	81	45	39	30
CLPLATEB:16	16	4	83	43	41	29
CLPLATEC:16	16	4	69	35	39	45
FMINSURF	16	—	64	34	41	23
FMINSRF2:16	16	—	82	46	51	28
HADAMALS:16	16	8	109	60	45	76
LMINSURF	16	12	41	24	19	17
NLMSURF:16	16	12	49	33	24	21
NOBNDTOR:16	16	13	36	20	16	29
POWELLSG:16	16	—	366	188	329	182
TORSION111:16	16	14	22	12	8	19
TORSION1:16	16	14	22	12	8	19
TORSION2:16	16	14	22	12	8	19
TORSIONA:16	16	14	22	14	8	12
TORSIONB:16	16	14	22	14	8	12
TORSIONC:16	16	14	22	12	8	9
TORSIOND:16	16	14	22	12	8	9
TORSION3:16	16	16	7	6	3	12
TORSION4:16	16	16	7	6	3	12
TORSION5:16	16	16	4	9	2	3
TORSION6:16	16	16	4	9	2	3
TORSIONE:16	16	16	4	5	2	6
TORSIONF:16	16	16	4	5	2	6
CHARDIS0:18	18	—	4	5	2	4

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
LINVERSE	19	8	240	686	110	173
CHEBYQAD:20	20	3	127	124	57	68
MANCINO:20	20	—	31	19	15	13
NONDIA:20	20	—	147	106	71	54
POWELLSG:20	20	—	390	198	299	249
POWER:20	20	—	79	78	56	27
POWELLBC:20	20	13	107	57	55	83
TRIDIA:20	20	—	85	43	28	52
NCB20B	21	—	190	98	198	93
NCB20B:22	22	—	254	130	229	244
RAYBENDL:24	24	4	1152	1241	—	400
RAYBENDS:24	24	4	3570	4563	—	1238
BIGGSB1	25	3	221	158	128	79
CHNROSNB:25	25	—	383	346	397	129
CHNRSNBM:25	25	—	632	416	452	218
ERRINROS:25	25	—	452	345	—	164
ERRINRSM:25	25	—	1254	666	—	1129
HATFLDC	25	12	49	32	31	17
NONSCOMP	25	12	333	239	163	154
OSCIPATH:25	25	—	182	117	104	62
QUARTC	25	—	39	65	19	36
SPMSRTLS	28	—	175	118	117	61
X3PK	30	1	4414	2268	—	—
EIGENCLS:30	30	—	520	270	303	187
MANCINO:30	30	—	32	19	17	14
NONDIA:30	30	—	184	96	92	78
POWER:30	30	—	79	65	62	27
TRIDIA	30	—	129	65	40	76
WATSON:31	31	—	1408	730	2883	—

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
EDENSCH	36	—	70	45	43	26
HADAMALS:36	36	24	192	147	78	122
LIARWHD	36	—	73	63	51	25
POWELLSG:36	36	—	421	215	375	361
CHARDIS0:40	40	—	4	5	2	4
POWELLSG:40	40	—	414	212	369	297
QR3DLS:40	40	1	4330	2196	—	2469
RAYBENDL	44	4	8754	—	—	3072
CLPLATEA	49	7	143	100	123	49
CLPLATEB	49	7	137	99	119	47
CLPLATEC	49	7	288	144	201	183
FMINSRF2:49	49	—	142	77	78	48
FMINSURF:49	49	—	112	63	72	38
LMINSURF:49	49	24	96	71	65	36
MSQRTALS:49	49	—	733	457	—	247
MSQRTBLS:49	49	—	584	296	454	198
NLMSURF:49	49	24	381	242	299	133
ARGLINA:50	50	—	7	5	3	7
ARGLINB:50	50	—	7	9	3	11
ARGLINC:50	50	—	7	13	3	11
BROYDN7D:50	50	—	290	201	225	98
BRYBND:50	50	—	67	39	39	23
BQPGABIM	50	26	119	61	44	59
BQPGASIM	50	27	108	56	51	68
CHNROSNB:50	50	—	730	538	581	246
CHNRSNBM:50	50	—	1013	752	533	341
CRAGGLVY:50	50	—	256	168	153	86
CHEBYQAD:50	50	6	196	309	574	68
CVXBQP1:50	50	50	3	1	1	1
DQDRTIC:50	50	—	23	13	11	52
DQRTIC:50	50	—	43	71	21	40

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
ENGVAL1:50	50	—	60	43	33	22
ERRINROS:50	50	—	445	349	—	153
ERRINRSM:50	50	—	1455	769	4644	1162
FREUROTH:50	50	—	78	40	40	29
HILBERTB:50	50	—	19	11	9	8
INDEFM:50	50	—	202	471	118	72
INDEF:50	50	50	56	162	22	74
MANCINO:50	50	—	37	28	19	17
MOREBV:50	50	—	1539	3176	571	1821
MCCORMCK:50	50	1	56	34	24	39
NCB20B:50	50	—	1024	518	1563	767
NONDIA:50	50	—	145	75	97	93
NONSCOMP:50	50	25	266	224	145	102
NCVXBQP3:50	50	49	34	18	20	97
NCVXBQP1:50	50	50	5	3	12	12
NCVXBQP2:50	50	50	22	12	16	94
PENALTY3	50	—	1179	1334	755	423
PENALTY1:50	50	—	234	282	139	86
PENALTY2:50	50	—	482	260	337	175
POWER:50	50	—	91	70	53	31
PROBPENL:50	50	—	8204	4564	—	—
PENTDI:50	50	37	28	21	14	10
SINQUAD:50	50	—	104	61	48	38
SPARSINE:50	50	—	469	235	291	204
SPARSQUR:50	50	—	24	41	12	23
SROSENBR:50	50	—	205	127	99	137
SSBRYBND:50	50	—	5532	2782	—	—
S368:50	50	32	9	33	18	7
TOINTGOR	50	—	396	237	217	136
TOINTPSP	50	—	284	148	277	119

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TOINTQOR	50	—	113	57	36	47
TOINTGSS:50	50	—	135	74	88	47
TQUARTIC:50	50	—	110	58	105	77
TRIDIA:50	50	—	217	109	59	96
VAREIGVL	50	—	64	41	39	22
VARDIM:50	50	—	101	85	43	52
CHARDIS0:60	60	—	4	5	2	4
POWELLSG:60	60	—	432	220	353	364
DECONVU	61	10	3206	1620	5286	2840
DECONVB	61	41	483	578	225	—
FMINSRF2	64	—	184	109	97	62
FMINSURF:64	64	—	150	76	79	53
HADAMALS:64	64	34	177	176	69	123
LMINSURF:64	64	28	127	96	75	43
MINSURF	64	28	85	60	43	29
NLMSURF:64	64	28	482	350	326	164
POWER:75	75	—	109	80	73	37
BRATU1D	77	2	1035	599	670	347
POWELLSG:80	80	—	568	290	405	326
DIXMAANA:90	90	—	15	11	7	6
DIXMAANB:90	90	—	19	13	9	7
DIXMAANC:90	90	—	22	15	11	8
DIXMAAND:90	90	—	25	15	13	9
DIXMAANE:90	90	—	158	83	61	54
DIXMAANF:90	90	—	172	86	99	60
DIXMAANG:90	90	—	144	87	95	50
DIXMAANH:90	90	—	172	95	95	60
DIXMAANI:90	90	—	529	265	186	245

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANJ:90	90	—	600	300	362	245
DIXMAANK:90	90	—	653	327	338	261
DIXMAANL:90	90	—	588	294	321	248
DIXMAANM:90	90	—	501	251	147	274
DIXMAANN:90	90	—	720	381	492	242
DIXMAANO:90	90	—	853	436	476	293
DIXMAANP:90	90	—	690	396	489	234
NONDIA:90	90	—	177	95	204	167
ARGLINA:100	100	—	7	5	3	7
ARGLINB:100	100	—	13	7	12	15
ARGLINC:100	100	—	52	32	25	33
ARWHEAD:100	100	—	57	35	37	23
BDQRTIC	100	—	133	81	114	47
BOXPOWER:100	100	—	27	17	11	19
BOX:100	100	—	83	43	44	35
BROWNAL:100	100	—	74	38	52	107
BROYDN7D:100	100	—	415	270	264	139
BRYBND:100	100	—	64	44	41	22
BDEXP	100	2	315	6133	111	—
BIGGSB1:100	100	3	904	914	611	310
CHARDIS0	100	—	4	5	2	4
CHAINWOO:100	100	—	1049	1097	489	415
COSINE:100	100	—	946	494	1077	—
CRAGGLVY:100	100	—	257	193	179	87
CURLY10:100	100	—	3726	2924	1746	1258
CURLY20:100	100	—	3064	1568	3197	1357
CURLY30:100	100	—	2324	1188	3328	1362
CHEBYQAD:100	100	4	293	341	2569	101
CLPLATEA:100	100	10	203	138	139	69
CLPLATEB:100	100	10	208	119	129	70
CLPLATEC:100	100	10	705	353	377	326

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
CHENHARK:100	100	30	5420	3500	1450	2378
CVXBP1	100	100	3	1	1	1
DIXON3DQ:100	100	—	405	203	107	351
DQDRTIC:100	100	—	23	13	11	13
DQRTIC:100	100	—	51	99	25	44
ENGVAL1:100	100	—	61	41	34	23
EXTROSNB:100	100	—	4860	5724	4936	1808
FLETBV3M:100	100	—	89	72	39	39
FLETGBV2:100	100	—	660	330	373	303
FLETGBV3:100	100	—	469	2410	4903	177
FLETCHCR:100	100	—	1782	1545	1247	608
FREUROTH:100	100	—	74	40	50	32
GENHUMPS:100	100	—	1024	752	918	348
GENROSE:100	100	—	1756	1546	1190	600
HADAMALS:100	100	76	372	349	434	132
HARKERP2	100	100	3	1	1	1
INDEFM:100	100	—	262	251	413	92
INDEF:100	100	100	51	100	19	78
LIARWHD:100	100	—	74	38	51	29
MANCINO:100	100	—	42	39	21	20
MOREBV:100	100	—	9288	4644	—	3969
MSQRTALS:100	100	—	1276	1299	1733	432
MSQRTBLS:100	100	—	2164	1546	1973	730
MCCORMCK:100	100	1	56	34	24	29
NONDQUAR	100	—	514	264	596	429
NCB20B:100	100	—	1948	978	3186	1183
NONCVXU2:100	100	—	1483	892	697	525
NONCVXUN:100	100	—	567	294	265	230
NONDIA:100	100	—	369	193	318	188

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
NOBNDTOR:100	100	49	155	81	59	62
NONSCOMP:100	100	50	240	189	116	92
NCVXBQP3:100	100	98	43	23	22	95
NCVXBQP1:100	100	100	5	3	12	12
NCVXBQP2:100	100	100	21	11	17	88
OSCIPTH:100	100	—	228	149	104	87
PENALTY1:100	100	—	217	270	122	79
PENALTY2:100	100	—	265	214	231	89
PENALTY3:100	100	—	2686	2820	1437	980
POWELLSG:100	100	—	530	272	335	316
POWER:100	100	—	112	89	65	38
PROBPENL:100	100	—	43	23	—	—
PENTDI:100	100	74	30	24	12	28
QUARTC:100	100	—	51	99	25	44
SCHMVETT:100	100	—	156	120	89	56
SENSORS:100	100	—	85	59	44	35
SINEALI:100	100	—	219	127	211	77
SINQUAD:100	100	—	97	54	41	42
SPARSINE:100	100	—	829	415	427	322
SPARSQUR:100	100	—	27	48	13	24
SPMSRTL:100	100	—	1449	—	713	—
SROSENBR:100	100	—	183	120	91	169
SSBRYBND:100	100	—	10936	5486	—	—
S368:100	100	73	10	28	25	8
TOINTGSS:100	100	—	103	67	73	35
TQUARTIC:100	100	—	218	131	129	76
TRIDIA:100	100	—	341	171	91	177

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSIONA:100	100	54	118	86	48	48
TORSIONB:100	100	54	118	86	48	48
TORSION111:100	100	58	102	67	38	38
TORSION1:100	100	58	102	67	38	38
TORSION2:100	100	58	102	67	38	38
TORSIONC:100	100	67	82	48	34	35
TORSIOND:100	100	67	82	48	34	35
TORSION3:100	100	71	78	40	32	42
TORSION4:100	100	71	78	40	32	42
TORSIONE:100	100	84	50	36	20	27
TORSIONF:100	100	84	50	36	20	27
TORSION5:100	100	86	46	33	18	19
TORSION6:100	100	86	46	33	18	19
VARDIM:100	100	—	122	113	52	61
VAREIGVL:100	100	—	73	43	43	25
WOODS:100	100	—	237	123	215	186
EXPLIN:101	101	95	166	153	82	120
EXPLIN2:101	101	101	5	3	3	12
BRATU1D:103	103	2	1084	818	893	366
EIGENALS	110	—	4266	2858	2414	1450
EIGENBLS	110	—	2141	1632	1065	781
NCB20:110	110	—	1162	596	—	1073
EXPQUAD	120	7	214	133	104	94
EXPLIN	120	70	543	295	318	208
EXPLIN2	120	101	215	172	97	152
QRTQUAD	120	5	269	151	172	201
QUDLIN:120	120	120	8	4	7	35
FMINSRF2:121	121	—	214	109	112	72
FMINSURF:121	121	—	176	99	94	60
LMINSURF:121	121	40	170	142	106	60
NLMSURF:121	121	40	946	878	674	324

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
HADAMALS:144	144	79	287	326	97	121
HOLMES	180	180	3	1	1	1
NCB20B:180	180	—	1298	1072	1037	446
DRCV2LQ	196	96	4966	2563	2392	1749
DRCV3LQ	196	96	9829	5439	4779	3798
HADAMALS:196	196	161	468	409	182	180
ARGLINA:200	200	—	7	5	3	8
ARGLINB:200	200	—	28	29	10	17
ARGLINC:200	200	—	23	19	10	15
BROWNAL:200	200	—	75	39	52	158
CHARDIS0:200	200	—	4	5	2	4
MODBEALE:200	200	—	409	207	320	640
PENALTY2:200	200	—	550	—	223	184
PENALTY3:200	200	—	6757	5683	3077	—
POWELLBC:200	200	104	2638	1456	3901	1031
VARDIM:200	200	—	120	116	52	68
HADAMALS:256	256	135	502	373	200	236
ODC:288	288	148	606	472	657	204
SSC:288	288	148	390	218	219	132
DIXMAANA:300	300	—	15	9	7	6
DIXMAANB:300	300	—	19	13	9	7
DIXMAANC:300	300	—	22	15	11	8
DIXMAAND:300	300	—	25	15	13	9
DIXMAANE:300	300	—	277	139	82	101
DIXMAANF:300	300	—	236	159	157	80

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANG:300	300	—	239	135	152	81
DIXMAANH:300	300	—	233	148	154	79
DIXMAANI:300	300	—	1781	891	576	790
DIXMAANJ:300	300	—	1452	802	851	492
DIXMAANK:300	300	—	1397	777	835	471
DIXMAANL:300	300	—	1248	791	698	422
DIXMAANM:300	300	—	1761	881	565	697
DIXMAANN:300	300	—	1904	1014	952	722
DIXMAANO:300	300	—	1952	1008	976	711
DIXMAANP:300	300	—	1868	934	974	816
HADAMALS:324	324	256	499	586	179	196
CHARDIS0:400	400	—	4	7	2	4
HADAMALS:400	400	306	545	869	421	189
JNLBRNG1:400	400	253	274	162	113	94
JNLBRNGA:400	400	253	317	248	116	111
JNLBRNG2:400	400	278	295	222	126	103
JNLBRNGB:400	400	302	399	201	108	141
OBSTCLBL:400	400	263	28	46	10	37
OBSTCLBM:400	400	263	28	46	10	37
OBSTCLBU:400	400	263	28	46	10	37
OBSTCLAE:400	400	398	9	5	5	15
OBSTCLAL:400	400	398	9	5	5	15
EIGENCLS	462	—	7080	3558	6221	2570
NOBNDTOR:484	484	143	192	190	161	68
TORSIONA:484	484	161	202	183	122	74
TORSIONB:484	484	161	202	183	122	74
TORSION111:484	484	186	184	163	129	64
TORSION1:484	484	186	184	163	129	64
TORSION2:484	484	186	184	163	129	64
TORSIONC:484	484	254	154	111	72	56
TORSIOND:484	484	254	154	111	72	56
TORSION3:484	484	267	193	103	78	74

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSION4:484	484	267	193	103	78	74
TORSIONE:484	484	362	107	83	44	39
TORSIONF:484	484	362	107	83	44	39
TORSION5:484	484	368	116	88	46	44
TORSION6:484	484	368	116	88	46	44
ARWHEAD:500	500	—	68	43	32	34
BDQRTIC:500	500	—	148	76	151	72
BROYDN7D:500	500	—	538	381	309	180
BRYBND:500	500	—	64	43	41	22
BDEXP:500	500	2	1514	—	506	—
CRAGGLVY:500	500	—	290	209	184	98
DQRTIC	500	—	59	141	29	54
DQDRTIC:500	500	—	23	13	11	17
FREUROTH:500	500	—	96	56	40	53
GENHUMPS:500	500	—	953	898	841	323
GENROSE:500	500	—	8466	7738	4429	2882
HARKERP2:500	500	500	3	1	1	1
LIARWHD:500	500	—	99	55	64	36
MOREBV:500	500	—	1489	818	551	501
MCCORMCK:500	500	1	56	39	24	33
NCB20B:500	500	—	1055	537	1086	470
NONDIA:500	500	—	663	355	537	350
NONDQUAR:500	500	—	569	293	546	337
NONSCOMP:500	500	250	266	187	118	105
OSCIPATH:500	500	—	211	112	101	75
PENALTY1:500	500	—	169	137	100	61
POWELLSG:500	500	—	645	329	377	341
POWER:500	500	—	255	135	137	87
PROBPENL:500	500	—	7	5	3	8
PENTDI:500	500	376	28	21	12	10

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
QUARTC:500	500	—	59	141	29	54
SCHMVETT:500	500	—	159	874	94	57
SINQUAD:500	500	—	155	100	65	71
SROSENBR:500	500	—	270	144	142	132
TOINTGSS:500	500	—	109	58	56	41
TQUARTIC:500	500	—	481	274	235	184
TRIDIA:500	500	—	857	429	220	447
VAREIGVL:500	500	—	73	47	43	25
BRATU1D:503	503	2	6081	—	3146	2051
CLPLATEA:529	529	23	552	327	363	186
CLPLATEB:529	529	23	428	264	281	144
CLPLATEC:529	529	23	1972	986	—	2811
ODC	864	164	576	342	431	194
SSC	864	164	397	220	170	135
FMINSRF2:961	961	—	271	294	154	93
FMINSURF:961	961	—	331	167	210	129
LMINSURF:961	961	120	607	679	410	207
NLMSURF:961	961	120	4301	3818	3085	1453
ARWHEAD:1000	1000	—	64	45	30	41
BDQRTIC:1000	1000	—	171	89	159	114
BOXPOWER:1000	1000	—	42	29	18	32
BOX:1000	1000	—	141	87	61	67
BROWNAL:1000	1000	—	107	57	48	66

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
BROYDN7D:1000	1000	—	526	466	312	176
BRYBND:1000	1000	—	64	47	41	22
BDEXP:1000	1000	2	3017	—	1007	—
BIGGSB1:1000	1000	3	7917	5295	3057	2679
CHAINWOO	1000	—	903	457	528	425
CURLY10	1000	—	25995	—	9808	8751
CHARDIS0:1000	1000	—	4	7	2	4
CRAGGLVY:1000	1000	—	271	192	173	91
CVXBQP1:1000	1000	1000	3	1	1	1
DIXON3DQ:1000	1000	—	4005	2003	1007	3764
DQDRTIC:1000	1000	—	23	13	11	23
DQRTIC:1000	1000	—	63	135	31	58
EG2	1000	—	428	228	232	216
ENGVAL1:1000	1000	—	66	55	31	26
EXTROSNB:1000	1000	—	4970	9086	5180	1844
FLETBV3M:1000	1000	—	52	81	22	42
FLETCBV2:1000	1000	—	4009	2005	1849	2199
FLETCBV3:1000	1000	—	14177	—	—	4817
FLETCHCR:1000	1000	—	16834	15541	8600	5724
FREUROTH:1000	1000	—	76	48	39	30
GENHUMPS	1000	—	1097	752	792	373
HARKERP2:1000	1000	1000	3	1	1	1
INDEFM	1000	—	558	—	297	200
INDEF	1000	1000	53	91	21	103
JNLBRNG1:1000	1000	366	278	195	134	94
JNLBRNGA:1000	1000	385	329	289	152	111
JNLBRNG2:1000	1000	524	505	359	335	173

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
JNLBRNGB:1000	1000	560	1347	725	492	453
LIARWHD:1000	1000	—	108	58	63	56
MOREBV:1000	1000	—	1468	1126	595	492
MCCORMCK:1000	1000	1	59	39	23	25
NONCVXU2	1000	—	5407	2709	2604	2615
NONCVXUN	1000	—	10021	8473	4213	—
NONDIA	1000	—	1340	963	914	496
NCB20B:1000	1000	—	1244	644	1189	514
NONDQUAR:1000	1000	—	618	320	375	297
NONSCOMP:1000	1000	500	274	162	138	106
NCVXBQP3	1000	983	93	49	36	111
NCVXBQP2	1000	993	80	49	30	104
NCVXBQP1	1000	1000	5	3	12	14
OSCIGRAD:1000	1000	—	1486	—	540	—
OBSTCLBL	1000	680	170	113	62	79
OBSTCLBM	1000	680	170	113	62	79
OBSTCLBU	1000	680	170	113	62	79
OBSTCLAL	1000	696	72	90	30	37
OBSTCLAE:1000	1000	696	72	90	30	37
PENALTY1:1000	1000	—	151	172	86	55
POWELLSG:1000	1000	—	575	295	479	364
POWER:1000	1000	—	348	195	189	120
POWELLBC:1000	1000	501	10829	—	—	3689
PENTDI	1000	751	25	21	12	9
QUARTC:1000	1000	—	63	135	31	58
SPARSINE	1000	—	17332	8666	4347	6042
SPARSQUR	1000	—	31	62	15	25
SSBRYBND	1000	—	20657	10337	—	7707

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SCHMVETT:1000	1000	—	185	236	89	67
SENSORS:1000	1000	—	111	144	78	47
SINEALI:1000	1000	—	192	157	175	68
SINQUAD:1000	1000	—	145	82	74	53
SROSENBR:1000	1000	—	278	148	177	185
TESTQUAD	1000	—	4056	2028	—	4727
TOINTGSS:1000	1000	—	99	73	57	35
TQUARTIC:1000	1000	—	291	155	323	197
TRIDIA:1000	1000	—	1237	619	316	733
VAREIGVL:1000	1000	—	73	47	43	25
WOODS:1000	1000	—	335	175	211	195
BRATU1D:1003	1003	1003	20170	—	—	6842
NCB20	1010	—	556	282	4468	372
CLPLATEA:1024	1024	32	870	549	619	296
CLPLATEB:1024	1024	32	529	309	315	181
CLPLATEC:1024	1024	32	3652	1826	—	7247
FMINSRF2:1024	1024	—	283	169	166	95
FMINSURF:1024	1024	—	370	206	200	124
HADAMALS:1024	1024	801	583	1651	674	201
LMINSURF:1024	1024	124	662	693	445	222
NLMSURF	1024	124	4388	3659	3148	1474
NOBNDTOR:1024	1024	235	319	228	203	115
TORSIONA:1024	1024	281	278	349	201	98
TORSIONB:1024	1024	281	278	349	201	98
TORSION111:1024	1024	323	242	305	213	84
TORSION1:1024	1024	323	242	305	213	84

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSION2:1024	1024	323	242	305	213	84
TORSIONC:1024	1024	493	153	150	107	53
TORSIOND:1024	1024	493	153	150	107	53
TORSION3:1024	1024	515	185	153	134	69
TORSION4:1024	1024	515	185	153	134	69
TORSIONE:1024	1024	761	160	97	69	58
TORSIONF:1024	1024	761	160	97	69	58
TORSION5:1024	1024	768	157	118	69	59
TORSION6:1024	1024	768	157	118	69	59
EXPQUAD:1200	1200	81	714	402	442	434
EXPLIN:1200	1200	1150	490	268	316	229
EXPLIN2:1200	1200	1181	197	181	81	142
QRTQUAD:1200	1200	50	1309	749	2527	2112
QUDLIN:1200	1200	1200	11	7	10	59
DIXMAANA:1500	1500	—	15	9	7	6
DIXMAANB:1500	1500	—	19	13	9	7
DIXMAANC:1500	1500	—	22	15	11	8
DIXMAAND:1500	1500	—	25	15	13	9
DIXMAANE:1500	1500	—	557	281	151	189
DIXMAANF:1500	1500	—	461	271	274	155
DIXMAANG:1500	1500	—	431	261	239	145
DIXMAANH:1500	1500	—	395	235	262	133
DIXMAANI:1500	1500	—	5665	3013	1840	1913
DIXMAANJ:1500	1500	—	2451	1679	1223	875
DIXMAANK:1500	1500	—	2325	1163	1473	807
DIXMAANL:1500	1500	—	1010	899	1091	340

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANM:1500	1500	—	5348	3321	1827	1820
DIXMAANN:1500	1500	—	2478	1775	1502	840
DIXMAANO:1500	1500	—	2290	1568	1344	780
DIXMAANP:1500	1500	—	1963	1592	1472	665
CHARDIS0:2000	2000	—	4	7	2	4
EDENSCH:2000	2000	—	75	45	42	29
MODBEALE:2000	2000	—	495	249	383	696
NCB20B:2000	2000	—	1176	1530	884	394
BQPGAUSS	2003	134	16618	20154	15615	5746
JNLBRNG1:2300	2300	809	348	281	218	120
JNLBRNGA:2300	2300	847	396	311	193	136
JNLBRNGB:2300	2300	1052	1772	906	977	634
JNLBRNG2:2300	2300	1077	623	403	291	211
OBSTCLBL:2300	2300	993	299	170	128	107
OBSTCLBM:2300	2300	993	299	170	128	107
OBSTCLBU:2300	2300	993	299	170	128	107
OBSTCLAE:2300	2300	1276	176	149	95	60
OBSTCLAL:2300	2300	1276	176	149	95	60
ODC:2376	2376	206	608	342	515	204
SSC:2376	2376	206	352	176	159	129
EIGENBLS:2550	2550	—	27925	—	15027	9409
EIGENCLS:2652	2652	—	44261	—	—	14993
DIXMAANA:3000	3000	—	15	9	7	6
DIXMAANB:3000	3000	—	19	13	9	7
DIXMAANC:3000	3000	—	22	15	11	8
DIXMAAND:3000	3000	—	25	15	13	9
DIXMAANE:3000	3000	—	715	371	225	243

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAANF:3000	3000	—	592	331	294	204
DIXMAANG:3000	3000	—	517	297	298	175
DIXMAANH:3000	3000	—	508	287	276	172
DIXMAANI:3000	3000	—	3768	2707	1640	1276
DIXMAANJ:3000	3000	—	932	2359	974	316
DIXMAANK:3000	3000	—	714	733	1005	242
DIXMAANL:3000	3000	—	1169	1801	838	393
DIXMAANM:3000	3000	—	3679	2829	1422	1253
DIXMAANN:3000	3000	—	3220	2039	1706	1096
DIXMAANO:3000	3000	—	2603	1643	1486	877
DIXMAANP:3000	3000	—	2042	1335	2406	692
JNLBRNG1:3200	3200	1130	378	291	209	130
JNLBRNGA:3200	3200	1168	433	383	222	147
JNLBRNG2:3200	3200	1400	723	488	422	245
JNLBRNGB:3200	3200	1446	2217	1123	824	1119
OBSTCLBL:3200	3200	1252	254	156	100	92
OBSTCLBM:3200	3200	1252	254	156	100	92
OBSTCLBU:3200	3200	1252	254	156	100	92
OBSTCLAE:3200	3200	1813	228	189	103	82
OBSTCLAL:3200	3200	1813	228	189	103	82
JNLBRNG1:3400	3400	1195	446	295	223	154
JNLBRNGA:3400	3400	1233	448	356	352	154
JNLBRNG2:3400	3400	1500	689	474	293	231
JNLBRNGB:3400	3400	1545	2259	1139	1366	1167
CHAINWOO:4000	4000	—	994	2052	824	344
CHARDIS0:4000	4000	—	4	7	2	4
WOODS:4000	4000	—	355	185	370	320
HADAMALS:4096	4096	3282	795	2785	2909	273

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
ARWHEAD:5000	5000	—	100	99	44	54
BDQRTIC:5000	5000	—	175	95	142	263
BROYDN7D:5000	5000	—	628	578	346	210
BRYBND:5000	5000	—	64	47	41	22
BIGGSB1:5000	5000	3	37586	26566	11520	12980
BDEXP:5000	5000	5000	3	1	1	1
CRAGGLVY:5000	5000	—	302	199	199	104
CHENHARK:5000	5000	2010	27965	14789	—	17792
DQDRTIC:5000	5000	—	23	13	11	22
DQRTIC:5000	5000	—	71	243	35	67
ENGVAL1:5000	5000	—	63	44	30	25
FLETBV3M:5000	5000	—	89	—	39	51
FLETGBV2:5000	5000	—	20005	10003	6707	8346
FREUROTH:5000	5000	—	90	59	39	36
GENHUMPS:5000	5000	—	931	810	710	319
HARKERP2:5000	5000	5000	3	1	1	1
INDEFM:5000	5000	—	247	—	97	220
INDEF:5000	5000	5000	56	1414	22	—
LIARWHD:5000	5000	—	141	95	67	81
MOREBV:5000	5000	—	1358	1126	593	456
MCCORMCK:5000	5000	1	62	44	25	26
NCB20B:5000	5000	—	1316	690	1373	451
NONCVXU2:5000	5000	—	21643	10881	10789	14086
NONCVXUN:5000	5000	—	27482	14050	—	—
NONDIA:5000	5000	—	1910	1030	1443	—

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
NONDQUAR:5000	5000	—	766	398	474	431
NONSCOMP:5000	5000	2500	264	185	131	96
POWELLSG:5000	5000	—	659	335	401	390
POWER:5000	5000	—	759	415	414	257
PENTDI:5000	5000	3751	28	23	12	10
QUARTC:5000	5000	—	71	243	35	67
QRTQUAD:5000	5000	549	30762	17602	9537	—
QUDLIN:5000	5000	5000	12	8	9	38
SCHMVETT:5000	5000	—	167	567	111	61
SINQUAD:5000	5000	—	137	147	60	51
SPARSQUR:5000	5000	—	35	56	17	32
SROSENB:5000	5000	—	624	428	306	272
SSBRYBND:5000	5000	—	25562	13812	16533	8612
TESTQUAD:5000	5000	—	4948	2474	7101	6359
TOINTGSS:5000	5000	—	118	78	54	47
TQUARTIC:5000	5000	—	686	451	539	252
TRIDIA:5000	5000	—	2829	1415	715	1496
VAREIGVL:5000	5000	—	73	47	43	25
NCB20:5010	5010	—	633	367	1426	223
CLPLATEA:5041	5041	71	2190	2126	1847	746
CLPLATEB:5041	5041	71	866	436	747	373
CLPLATEC:5041	5041	71	15872	7936	—	—
ODC:5184	5184	284	627	379	611	211
SSC:5184	5184	284	381	191	197	159
MINSURFO:5306	5306	1762	3937	2047	1849	2375
NOBNDTOR:5476	5476	801	662	615	530	224

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
TORSIONA:5476	5476	1096	704	407	698	244
TORSIONB:5476	5476	1096	704	407	698	244
TORSION111:5476	5476	1219	613	574	701	211
TORSION1:5476	5476	1219	613	574	701	211
TORSION2:5476	5476	1219	613	574	701	211
TORSIONC:5476	5476	2328	422	246	182	150
TORSIOND:5476	5476	2328	422	246	182	150
TORSION3:5476	5476	2386	470	315	196	166
TORSION4:5476	5476	2386	470	315	196	166
TORSIONE:5476	5476	3782	218	180	86	133
TORSIONF:5476	5476	3782	218	180	86	133
TORSION5:5476	5476	3805	292	179	177	102
TORSION6:5476	5476	3805	292	179	177	102
FMINSRF2:5625	5625	—	525	318	317	179
FMINSURF:5625	5625	—	540	320	318	186
LMINSURF:5625	5625	296	1579	1864	1247	529
NLMSURF:5625	5625	296	15218	13093	9712	5148
ODC:7344	7344	344	729	451	785	245
SSC:7344	7344	344	560	280	235	193
JNLBRNG1:7500	7500	2605	992	540	545	348
JNLBRNGA:7500	7500	2676	959	628	526	327
JNLBRNG2:7500	7500	3171	1375	940	954	471
JNLBRNGB:7500	7500	3395	3265	1661	2375	2307
OBSTCLBL:7500	7500	2859	401	282	207	143
OBSTCLBM:7500	7500	2859	401	282	207	143
OBSTCLBU:7500	7500	2859	401	282	207	143
OBSTCLAE	7500	3819	434	396	271	146
OBSTCLAL:7500	7500	3819	434	396	271	146
DIXMAANA:9000	9000	—	15	9	7	6
DIXMAANB:9000	9000	—	19	13	9	7
DIXMAANC:9000	9000	—	22	15	11	8

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
DIXMAAND:9000	9000	—	25	17	13	9
DIXMAANE:9000	9000	—	956	573	306	326
DIXMAANF:9000	9000	—	788	479	436	268
DIXMAANG:9000	9000	—	804	453	437	274
DIXMAANH:9000	9000	—	750	433	428	254
DIXMAANI:9000	9000	—	1384	2045	858	468
DIXMAANJ:9000	9000	—	828	751	512	282
DIXMAANK:9000	9000	—	582	1194	469	198
DIXMAANL:9000	9000	—	651	1284	435	219
DIXMAANM:9000	9000	—	1680	2040	1202	574
DIXMAANN:9000	9000	—	1806	1958	1073	616
DIXMAANO:9000	9000	—	2102	2157	1301	722
DIXMAANP:9000	9000	—	2219	1709	1507	759
BOXPOWER	10000	—	27	25	11	37
BOX	10000	—	143	75	82	112
BROYDN7D:10000	10000	—	589	905	339	197
BRYBND:10000	10000	—	64	47	41	22
CHAINWOO:10000	10000	—	1083	551	1218	454
CVXBQP1:10000	10000	10000	3	1	1	1
DIXON3DQ:10000	10000	—	40009	20005	10008	26046
FLETBV3M:10000	10000	—	74	—	30	37
FLETCBV2:10000	10000	—	37579	—	10012	12835
FMINSRF2:10000	10000	—	684	401	411	230
FMINSURF:10000	10000	—	667	405	411	225
HARKERP2:10000	10000	10000	3	1	1	1
INDEFM:10000	10000	—	304	170	523	209

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
JNLBRNG1:10000	10000	3443	1304	780	662	448
JNLBRNGA:10000	10000	3568	1434	998	937	490
JNLBRNG2:10000	10000	4209	1812	1023	924	608
JNLBRNGB:10000	10000	4484	4824	2442	2740	2865
LIARWHD:10000	10000	—	129	69	66	65
LMINSURF:10000	10000	396	2289	2316	1743	765
MCCORMCK:10000	10000	1	53	44	22	23
NONCVXU2:10000	10000	—	28906	16244	13670	13946
NONCVXUN:10000	10000	—	21612	11140	—	—
NONDIA:10000	10000	—	2888	1715	1370	1016
NONDQUAR:10000	10000	—	968	502	566	457
NLMSURF:10000	10000	396	23680	—	14536	8004
NOBNDTOR:10000	10000	1299	993	761	840	337
NONSCOMP:10000	10000	5000	237	173	117	115
NCVXBQP3:10000	10000	9808	196	133	103	124
NCVXBQP2:10000	10000	9934	127	157	72	101
NCVXBQP1:10000	10000	10000	5	3	12	16
OSCIGRAD:10000	10000	—	5459	—	1985	—
OBSTCLBL:10000	10000	3896	480	275	278	166
OBSTCLBM:10000	10000	3896	480	275	278	166
OBSTCLBU:10000	10000	3896	480	275	278	166
OBSTCLAE:10000	10000	5061	456	392	301	156
OBSTCLAL:10000	10000	5061	456	392	301	156
POWELLSG:10000	10000	—	590	302	393	446
POWER:10000	10000	—	1012	582	588	344
QUARTC:10000	10000	—	75	245	37	71
SCHMVETT:10000	10000	—	174	701	87	64
SINQUAD:10000	10000	—	197	137	75	71
SPARSQUR:10000	10000	—	39	62	19	25

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
SROSENB:10000	10000	—	881	640	532	321
TOINTGSS:10000	10000	—	113	77	51	48
TQUARTIC:10000	10000	—	1129	657	626	415
TRIDIA:10000	10000	—	4021	2011	1011	2550
TORSIONA:10000	10000	1839	935	598	595	323
TORSIONB:10000	10000	1839	935	598	595	323
TORSION111:10000	10000	2013	954	502	917	435
TORSION1:10000	10000	2013	954	502	917	435
TORSION2:10000	10000	2013	954	502	917	435
TORSIONC:10000	10000	4105	615	347	487	211
TORSIOND:10000	10000	4105	615	347	487	211
TORSION3:10000	10000	4189	566	367	238	236
TORSION4:10000	10000	4189	566	367	238	236
TORSIONE:10000	10000	6685	351	214	143	141
TORSIONF:10000	10000	6685	351	214	143	141
TORSION5:10000	10000	6720	334	243	134	146
TORSION6:10000	10000	6720	334	243	134	146
WOODS:10000	10000	—	540	419	446	186
JNLBRNG1:12500	12500	4277	1506	798	883	695
JNLBRNGA:12500	12500	4469	1531	1075	1141	527
JNLBRNG2:12500	12500	5197	2422	1435	1692	824
JNLBRNGB:12500	12500	5630	5603	2841	5110	3920
OBSTCLBL:12500	12500	4623	618	342	274	212
OBSTCLBM:12500	12500	4623	618	342	274	212
OBSTCLBU:12500	12500	4623	618	342	274	212

problem	dim	nact	nf2g best	nf for solver		
				LMBOPT	ASACG	LMBFG-EIG-MS
OBSTCLAE:12500	12500	6481	652	365	385	226
OBSTCLAL:12500	12500	6481	652	365	385	226
ODC:14544	14544	544	1705	1047	1361	571
SSC:14544	14544	544	949	480	279	325
NOBNDTOR:14884	14884	1758	1413	986	1761	479
TORSIONA:14884	14884	2618	1014	730	1110	344
TORSIONB:14884	14884	2618	1014	730	1110	344
TORSION111:14884	14884	2830	1130	785	1667	388
TORSION1:14884	14884	2830	1130	785	1667	388
TORSION2:14884	14884	2830	1130	785	1667	388
TORSIONC:14884	14884	6034	903	486	391	305
TORSIOND:14884	14884	6034	903	486	391	305
TORSION3:14884	14884	6137	716	417	414	244
TORSION4:14884	14884	6137	716	417	414	244
TORSIONE:14884	14884	9868	411	247	163	173
TORSIONF:14884	14884	9868	411	247	163	173
TORSION5:14884	14884	9914	544	290	252	205
TORSION6:14884	14884	9914	544	290	252	205
FMINSRF2:15625	15625	—	794	442	491	268
FMINSURF:15625	15625	—	779	460	491	263
LMINSURF:15625	15625	496	2854	3154	2263	952
NLMSURF:15625	15625	496	32574	—	26254	11020
BOXPOWER:20000	20000	—	30	29	12	16
MODBEALE:20000	20000	—	651	327	411	596
MCCORMCK:50000	50000	1	54	44	24	24
BOX:100000	100000	—	226	122	169	314
INDEFM:100000	100000	—	898	—	366	800
OSCIGRAD:100000	100000	—	2578	—	908	—
DEGDIAG:100001	100001	100001	3	1	1	1
DEGTRID2:100001	100001	100001	3	1	1	1