

Supplementary information

We analyzed following 297 test problems from the CUTEst.

Table 7.1: 297 Test functions [8]

Problem	Name	Dim.	Problem	Name	Dim.
BQP1VAR	1	OSLBQP	8	SPMSRTL5	4999
AKIVA	2	PALMER4E	8	ARWHEAD	5000
BEALE	2	PALMER5E	8	BDEXP	5000
BRKMCC	2	PALMER6E	8	BDQRTIC	5000
BROWNB5	2	PALMER7E	8	BROYDN7D	5000
CAMEL6	2	PALMER8E	8	BRYBND	5000
CLIFF	2	HEART8LS	8	CHENHARK	5000
CUBE	2	PALMER2C	8	CRAGGLVY	5000
DENSCHNA	2	PALMER2E	8	DQDRTIC	5000
DENSCHNB	2	PALMER5A	8	DQRTIC	5000
DENSCHNC	2	PALMER6C	8	ENGVAL1	5000
DENSCHNF	2	PALMER7C	8	FLETBV3M	5000
EXPFIT	2	PALMER4C	8	FLETGBV2	5000
HILBERTA	2	PALMER8C	8	FLETCHBV	5000
HIMMELBB	2	PALMER1C	8	FREUROTH	5000
HIMMELBG	2	VIBRBEAM	8	INDEF	5000
HIMMELBH	2	S368	8	LIARWHD	5000
HS1	2	MAXLIKA	8	MCCORMCK	5000
HS2	2	PALMER5B	9	MOREBV	5000
HS3	2	SPECAN	9	NCB20B	5000
HS3MOD	2	HILBERTB	10	NONCVXU2	5000
HS5	2	HS110	10	NONCVXUN	5000
HUMPS	2	OSCIPATH	10	NONDIA	5000
JENSMP	2	SSCOSINE	10	NONDQUAR	5000
22					
LOGHAIRY	2	STRATEC	10	NONSCOMP	5000
LOGROS	2	OSBORNEB	11	PENTDI	5000
MARATOSB	2	WATSON	12	POWELLSG	5000
MEXHAT	2	DIXMAANM	15	QUARTC	5000
ROSENBR	2	DIXMAANN	15	SCHMVETT	5000
S308	2	DIXMAANO	15	SINQUAD	5000
SIM2BQP	2	DIXMAANP	15	SPARSINE	5000
SIMBQP	2	PARKCH	15	SROSENBR	5000
SINEVAL	2	HATFLDC	25	SBRYBND	5000
SISSER	2	3PK	30	TOINTGSS	5000
SNAIL	2	BQPGABIM	50	TQUARTIC	5000
ZANGWIL2	2	BQPGASIM	50	TRIDIA	5000
HIMMELP1	2	CHNROSNB	50	TESTQUAD	5000
HAIRY	2	CHNRSNBM	50	QRTQUAD	5000
DJTL	2	ERRINROS	50	GENHUMPS	5000
MDHOLE	2	ERRINRSM	50	SBRYBND	5000
HS4	2	TOINTGOR	50	SCOSINE	5000
BARD	3	TOINTPSP	50	QUDLIN	5000
BOX2	3	TOINTQOR	50	SCOND1LS	5002
BOX3	3	VAREIGVL	50	BRATU1D	5005
DENSCHND	3	DECONVB	63	NCB20	5010
ENGVAL2	3	DECONVU	63	CLPLATEA	5041
GULF	3	MINSURF	64	CLPLATEB	5041
HATFLDD	3	HYDC20LS	99	CLPLATEC	5041
HATFLDE	3	MANCINO	100	MINSURFO	5306
HATFLDFL	3	SENSORS	100	NOBNDTOR	5476
HELIX	3	CHEBYQAD	100	ODC	5476
HS25	3	HOLMES	180	TORSION3	5476
KOEBHEL5	3	ARGLINA	200	TORSION4	5476

PFIT1LS	3	BROWNAL	200	TORSION1	5476
PFIT2LS	3	PENALTY3	200	TORSION2	5476
PFIT4LS	3	VARDIM	200	TORSION5	5476
YFIT	3	ARGLINC	200	TORSION6	5476
YFITU	3	HADAMALS	400	TORSIONA	5476
WEEDS	3	GENROSE	500	TORSIONB	5476
EG1	3	PROBPENL	500	TORSIONC	5476
MEYER3	3	QR3DLS	610	TORSIOND	5476
DENSCHNE	3	EXTROSNB	1000	TORSIONE	5476
GROWTHLS	3	FLETCHCR	1000	TORSIONF	5476
HIELOW	3	PENALTY1	1000	SSC	5476
PFIT3LS	3	EG2	1000	FMINSURF	5625
ALLINIT	4	SINEALI	1000	NLMSURF	5625
ALLINITU	4	HARKERP2	1000	FMINSRF2	5625
BROWNDEN	4	POWELLBC	1000	LMINSURF	5625
HIMMELBF	4	MSQRTALS	1024	WALL20	5924
HS38	4	MSQRTBLS	1024	GRIDGENA	6218
KOWOSB	4	EXPLIN	1200	BOX	10000
PALMER1	4	EXPQUAD	1200	COSINE	10000
PALMER2	4	LINVERSE	1999	DIXON3DQ	10000
PALMER3	4	CHARDIS0	2000	JNLBRNG1	10000
PALMER3B	4	EDENSCH	2000	JNLBRNG2	10000
PALMER4	4	BQPGAUSS	2003	JNLBRNGA	10000
23					
PALMER4B	4	RAYBENDS	2050	JNLBRNGB	10000
PALMER5D	4	RAYBENDL	2050	SPARSQUR	10000
PSPDOC	4	EIGENALS	2550	POWER	10000
PALMER2B	4	EIGENBLS	2550	OBSTCLAE	10000
PALMER1B	4	EIGENCLS	2652	OBSTCLAL	10000
HATFLDA	4	DIXMAANA	3000	OBSTCLBL	10000
HATFLDB	4	DIXMAANB	3000	OBSTCLBM	10000
OSBORNEA	5	DIXMAANC	3000	OBSTCLBU	10000
HS45	5	DIXMAAND	3000	CURLY10	10000
BIGGS3	6	DIXMAANE	3000	CURLY20	10000
BIGGS5	6	DIXMAANF	3000	CURLY30	10000
HART6	6	DIXMAANG	3000	CVXBQP1	10000
PALMER2A	6	DIXMAANH	3000	SCURLY10	10000
PALMER3A	6	DIXMAANI	3000	SCURLY20	10000
PALMER4A	6	DIXMAANJ	3000	SCURLY30	10000
PALMER5C	6	DIXMAANK	3000	BOXPOWER	20000
PALMER6A	6	DIXMAANL	3000	MODBEALE	20000
PALMER7A	6	JIMACK	3549	WALL50	37311
PALMER8A	6	WOODS	4000	DEGDIAG	1.00E+05
PALMER1A	6	CHAINWOO	4000	DEGTRID	1.00E+05
HEART6LS	6	DRCV1LQ	4624	DEGTRID2	1.00E+05
PALMER1D	7	DRCV2LQ	4624	OSCIGRAD	1.00E+05
AIRCRFTB	8	DRCV3LQ	4624	INDEFM	1.00E+05