Numerical Results for SCG

Theta spectral, Powell restart, 750 problems

Stopping criterion: $\|\nabla f(x_k)\|_\infty \leq 10^{-6}$.

CG with Powell restart. May 2, 2006

1 *** CG Algorithm ***. Function:FREUROTH (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	14	8	29	14	8	.2449212683962E+05	.1333963857976E-05
2000	16	9	34	14	11	.4898425367924E+05	.6647963300215E-06
3000	36	24	144	30	31	.7347638051886E+05	.1900639373488E-04
4000	18	11	38	18	14	.9796850735848E+05	.1659294453897E-04
5000	29	18	74	29	31	.1224606341981E+06	.6864104316210E-04
6000	15	9	34	15	18	.1469527610377E+06	.1596493497679E-04
7000	24	13	53	23	34	.1714448878773E+06	.1783042363383E-05
8000	98	74	959	88	442	.1959370147169E+06	.5092262667649E-04
9000	36	21	160	34	99	.2204291415566E+06	.5194861024245E-04
10000	12	8	27	12	25	.2449212683962E+06	.9580661905429E-07
TOTAL	298	195	1552	277	7.13 (seconds)	proc= 65.44%	

2 *** CG Algorithm ***. Function:Extended Trigonometric

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	29	18	52	18	8	.1518522500643E-09	.9802258364155E-05
2000	33	19	59	22	18	.1504720247086E-11	.2368362982499E-05
3000	29	22	52	19	25	.1522048835930E-11	.2343325933311E-05
4000	30	22	56	21	34	.3981729398917E-11	.3053596740426E-05
5000	30	23	56	22	43	.9165537446340E-12	.1567738544074E-05
6000	33	23	55	19	53	.3145319978270E-08	.6651477747469E-05
7000	32	21	55	20	61	.1338263800516E-11	.1808989891943E-05
8000	32	21	57	22	72	.2803005318556E-10	.4599748836074E-05
9000	34	24	59	22	84	.1111804759997E-12	.6018215003448E-06
10000	35	24	61	23	95	.3167066953664E-12	.9270835419956E-06
TOTAL	317	217	562	208	4.93 (seconds)	proc= 68.45%	

3 *** CG Algorithm ***. Function:SROSENBR (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	39	22	85	33	9	.1192679275458E-17	.4785783076340E-07
2000	38	21	87	33	18	.1663939700096E-09	.1152946415200E-04
3000	40	23	89	33	28	.3492645486146E-16	.5281717027408E-08
4000	38	21	89	33	37	.9347548955419E-09	.2732607018968E-04
5000	38	21	89	33	48	.9500697723490E-09	.2754916848843E-04
6000	38	21	89	33	55	.8721274542016E-09	.2639513262218E-04
7000	38	21	89	33	65	.7431258861522E-09	.2436512861321E-04
8000	40	23	92	34	78	.1192597132418E-15	.9759888085636E-08
9000	40	23	92	34	87	.1046533191460E-15	.9142696313539E-08
10000	37	21	82	32	87	.2307635095219E-16	.4918071282073E-07
TOTAL	386	217	883	331	5.12 (seconds)	proc= 56.22%	

4 *** CG Algorithm ***. Function:Extended White & Holst

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	32	17	62	23	7	.2945889027348E-12	.3915198524069E-06
2000	32	17	65	25	14	.9395224766606E-14	.8175244820976E-07
3000	32	17	65	25	22	.5274442978335E-13	.1921763059248E-06
4000	32	17	65	25	28	.2900209775184E-11	.1377161178026E-05
5000	33	17	66	25	37	.2345015795954E-12	.3061313187915E-06
6000	33	18	66	25	43	.2905735877455E-12	.3407711267147E-06
7000	33	19	67	26	52	.6742871964001E-12	.5191073803238E-06

8000	33	19	67	26	59	.2066988000119E-11	.9088742693369E-06
9000	33	19	67	26	68	.2297331219017E-11	.9581788844386E-06
10000	33	19	67	26	74	.1855062630474E-12	.2722789863901E-06
TOTAL	326	179	657	252	4.04 (seconds)	proc= 54.91%	

5 *** CG Algorithm ***. Function:Extended Beale BEALE (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	12	7	23	10	1	.6952220819271E-15	.2609569807540E-06
2000	12	8	24	10	4	.7273850766067E-15	.2407748903964E-06
3000	12	8	24	10	5	.4917138815382E-13	.2102356097507E-05
4000	12	8	24	10	7	.7032877123208E-14	.8237958631966E-06
5000	12	8	24	10	9	.4634231375842E-14	.6663540891274E-06
6000	12	8	24	10	11	.5143328769932E-14	.7071945293141E-06
7000	12	8	24	10	12	.7245397328613E-14	.8312748645575E-06
8000	12	8	24	10	14	.1137687184740E-13	.1050236864281E-05
9000	12	8	24	10	16	.1895738304297E-13	.1352686119767E-05
10000	12	8	24	10	18	.3233903070537E-13	.1765843238273E-05
TOTAL	120	79	239	100	.97 (seconds)	proc= 65.83%	

6 *** CG Algorithm ***. Function:Extended Penalty

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	19	11	43	12	4	.8831940750670E+03	.1198860120824E-04
2000	9	5	31	9	5	.1814063664869E+04	.3555108754607E-05
3000	10	7	33	9	8	.2755973749503E+04	.2430139942357E-05
4000	29	21	56	20	23	.3704070534948E+04	.2211439760252E-04
5000	10	7	34	9	13	.4656333923744E+04	.5291916154720E-05
6000	17	14	45	17	24	.5611676659140E+04	.7506807786310E-06
7000	19	16	48	18	31	.6569428560737E+04	.2522969798821E-05
8000	9	6	34	9	21	.7529139638522E+04	.9781035278039E-06
9000	18	14	48	16	39	.8490489281459E+04	.1952133330481E-05
10000	18	11	46	11	41	.9453238852842E+04	.3802892577153E-04
TOTAL	158	112	418	130	2.09 (seconds)	proc= 70.89%	

7 *** CG Algorithm ***. Function:Perturbed Quadratic

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	372	100	575	202	50	.2522343349113E-12	.2730104651432E-05
2000	413	109	640	226	113	.8480798170729E-13	.3314679392970E-05
3000	557	151	865	307	229	.1609476222627E-12	.4200262735581E-05
4000	752	211	1172	419	411	.9549696104881E-13	.3129670456303E-05
5000	743	198	1165	421	509	.1587384747714E-12	.2509059011044E-05
6000	833	230	1305	471	685	.9735375848770E-13	.2250681331198E-05
7000	1005	268	1574	568	965	.7727177441741E-13	.4009793314909E-05
8000	1124	321	1743	618	1226	.2244904137560E-12	.3042408007579E-05
9000	1100	307	1734	633	1357	.1712039995822E-12	.7426813370295E-05
10000	958	263	1507	548	1312	.1071890875685E-12	.5102917272232E-05
TOTAL	7857	2158	12280	4413	68.57 (seconds)	proc= 27.47%	

8 *** CG Algorithm ***. Function:Raydan 1

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	386	191	688	256	56	.5005000000000E+05	.1001241103343E-05
2000	609	299	1019	325	165	.2001000000000E+06	.2076363195735E-05
3000	731	432	1179	360	283	.4501500000000E+06	.6948732291153E-06
4000	1275	884	2104	567	587	.8002000000000E+06	.9783947842002E-06
5000	1356	880	2259	659	811	.1250250000000E+07	.1279615137378E-05
6000	1661	1190	2528	623	1114	.1800300000000E+07	.1275044214591E-05
7000	1967	1561	2897	541	1421	.2450350000000E+07	.9977160409153E-06
8000	2001	1584	2637	462	1594	.3200400000000E+07	.3411314064317E-05

9000	995	563	1763	515	1172	.4050450000000E+07	.8841180508157E-06
10000	1691	1147	2896	775	2007	.5000500000000E+07	.1416130383874E-05
TOTAL	12672	8731	19970	5083	92.10 (seconds)	proc= 68.90%	

9 *** CG Algorithm ***. Function:Raydan 2

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	4	4	9	4	1	.1000000000000E+04	.1635064626602E-06
2000	4	4	9	4	1	.2000000000000E+04	.2278967161880E-06
3000	4	4	9	4	2	.3000000000000E+04	.2772727595593E-06
4000	4	4	9	4	3	.4000000000000E+04	.3189085980221E-06
5000	4	4	9	4	3	.5000000000000E+04	.3555877027040E-06
6000	4	4	9	4	4	.6000000000000E+04	.3887518440354E-06
7000	4	4	9	4	5	.7000000000000E+04	.4192397568158E-06
8000	4	4	9	4	5	.8000000000000E+04	.4476277637395E-06
9000	4	4	9	4	6	.9000000000000E+04	.4742712167625E-06
10000	4	4	9	4	7	.1000000000000E+05	.4994223595876E-06
TOTAL	40	40	90	40	.37 (seconds)	proc= *****%	

10 *** CG Algorithm ***. Function:Powell singular (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	55	20	103	47	11	.3514653954223E-06	.2034476917092E-04
2000	60	20	113	52	23	.3149363248464E-06	.1382685335756E-04
3000	67	24	127	59	40	.4079839149374E-06	.1610979152917E-04
4000	71	26	129	57	54	.2377458607847E-05	.4400548712005E-04
5000	71	25	134	62	71	.6028353061124E-06	.2250747301104E-04
6000	57	18	108	50	67	.1390406257422E-05	.3513874872808E-04
7000	70	20	134	62	96	.6186382128411E-06	.1675471232462E-04
8000	59	20	112	51	93	.5169289089298E-06	.1145722857806E-04
9000	74	23	140	64	130	.1327721626750E-05	.2704149823705E-04
10000	74	29	139	63	144	.1236073788811E-05	.5010292723947E-04
TOTAL	658	225	1239	567	7.29 (seconds)	proc= 34.19%	

11 *** CG Algorithm ***. Function:Diagonal 1

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	46	11	77	30	10	.3435362229366E-09	.4219787043340E-06
2000	36	9	63	26	15	.4881449841214E-09	.6606719090891E-06
3000	38	10	65	26	23	.2715915642058E-09	.8786454414687E-06
4000	36	9	63	26	31	.1319620386128E-09	.1048265058565E-05
5000	37	9	65	27	39	.9879304602412E-11	.4105534065765E-06
6000	36	9	63	26	46	.7619530496051E-10	.1189477727822E-05
7000	36	9	63	26	53	.6698347594173E-10	.1299790949638E-05
8000	37	9	65	27	62	.6169198972728E-10	.2579706516623E-06
9000	37	9	65	27	70	.5943337884238E-10	.2381046246289E-06
10000	37	9	65	27	78	.5848038628397E-10	.2248510971019E-06
TOTAL	376	93	654	268	4.27 (seconds)	proc= 24.73%	

12 *** CG Algorithm ***. Function:Diagonal 2

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	4	4	9	4	1	-.2149394739916E+03	.3758437105448E-07
2000	4	4	9	4	2	-.4298789479833E+03	.5307640145397E-07
3000	4	4	9	4	4	-.6448184219748E+03	.6494026411719E-07
4000	4	4	9	4	5	-.8597578959666E+03	.7494748938377E-07
5000	4	4	9	4	5	-.1074697369958E+04	.8376598706232E-07
6000	4	4	9	4	7	-.1289636843950E+04	.9173261915580E-07
7000	4	4	9	4	9	-.1504576317941E+04	.9905292180846E-07
8000	4	4	9	4	9	-.1719515791934E+04	.1058789098799E-06
9000	4	4	9	4	10	-.1934455265925E+04	.1122924321282E-06

```
10000      4     4      9     4        12 -.2149394739916E+04  .1183152131823E-06
-------------------------------------------------------------------------------
TOTAL     40    40     90    40       .64 (seconds)    proc= *****%


 13  *** CG Algorithm ***. Function:Hager

theta spectral.  betatype = 41  (Scaled Perry  -  Birgin & Martinez).  stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm2
-------------------------------------------------------------------------------
 1000    296   271   8228   280       473 -.4474419132154E+05  .9886600745738E-06
 2000    478   450  13689   453      1534 -.1471735005125E+06  .1373196277710E-05
 3000    920   884  27820   895      4750 -.2925501003138E+06  .1034975799708E-05
 4000   1998  1955  63802  1964     14587 -.4746425076978E+06  .1546361707628E-05
 5000   2001  1962  63679  1970     18005 -.6896067628040E+06  .2023063401120E-05
 6000   1743  1697  54765  1709     18457 -.9347349321991E+06  .1147526630958E-05
 7000   2001  1952  63312  1964     24813 -.1207973806382E+07  .3526942854809E-05
 8000   2001  1953  63108  1962     28161 -.1507691037216E+07  .5631856965088E-05
 9000   2001  1949  63846  1968     32203 -.1832544956898E+07  .1405580823499E-04
10000   2001  1946  62656  1965     35408 -.2181405217178E+07  .3362643382304E-05
-------------------------------------------------------------------------------
TOTAL  15440 15019 484905 15130   1783.91 (seconds)    proc= 97.27%


 14  *** CG Algorithm ***. Function:Generalized Tridiagonal 1

theta spectral.  betatype = 41  (Scaled Perry  -  Birgin & Martinez).  stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm2
-------------------------------------------------------------------------------
 1000     23     3     51    23         6  .9972103074860E+03  .1368357799061E-05
 2000     21     4     45    19        12  .1997210307486E+04  .1718774704636E-05
 3000     21     5     48    20        18  .2997210307486E+04  .1740015688661E-05
 4000     36    20    526    34       202  .3997210307486E+04  .2016387046715E-05
 5000     39    23    560    37       259  .4997210307486E+04  .2488648573884E-05
 6000     42    27    666    39       379  .5997210307486E+04  .2069798069808E-05
 7000     53    40    996    50       643  .6997210307486E+04  .1071444967303E-05
 8000     44    29    567    41       423  .7997210307486E+04  .1076141679076E-05
 9000     48    34    811    45       684  .8997210307486E+04  .2070513584395E-05
10000     23     9     51    20        65  .9997210307486E+04  .2236761171474E-05
-------------------------------------------------------------------------------
TOTAL    350   194   4321   328     26.91 (seconds)    proc= 55.43%


 15  *** CG Algorithm ***. Function:Extended Tridiagonal 1

theta spectral.  betatype = 41  (Scaled Perry  -  Birgin & Martinez).  stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm2
-------------------------------------------------------------------------------
 1000     11     6     22    10         2  .1358383938489E-07  .1035603585619E-04
 2000     11     6     22    10         5  .4773659977587E-07  .3209330425936E-04
 3000     10     5     21    10         6  .1356173110213E-05  .3645549769235E-04
 4000     10     5     21    10         8  .1824600290602E-05  .4234037099954E-04
 5000     10     5     21    10        10  .2277945912945E-05  .4726428304752E-04
 6000     10     5     21    10        13  .2720767739585E-05  .5157019331077E-04
 7000     10     5     21    10        14  .3155737093590E-05  .5543905718038E-04
 8000     10     5     21    10        17  .3584565733128E-05  .5897903085211E-04
 9000     10     5     21    10        19  .4008424639671E-05  .6226046582739E-04
10000     10     5     21    10        20  .4428155289234E-05  .6533200534199E-04
-------------------------------------------------------------------------------
TOTAL    102    52    212   100      1.14 (seconds)    proc= 50.98%


 16  *** CG Algorithm ***. Function:Extended Three Expo Terms

theta spectral.  betatype = 41  (Scaled Perry  -  Birgin & Martinez).  stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm2
-------------------------------------------------------------------------------
 1000     10     6     17     6         2  .1279633348329E+04  .5955239906355E-06
 2000      8     5     14     5         3  .2559266696658E+04  .3082156255283E-04
 3000     14     8     22     7         8  .3838900044987E+04  .7783159717131E-05
 4000     12     7     19     6         9  .5118533393317E+04  .2769934049109E-04
 5000     13     7     21     7        13  .6398166741646E+04  .6511081075972E-04
 6000     12     7     19     6        14  .7677800089975E+04  .2300415696635E-04
 7000     12     7     19     6        17  .8957433438305E+04  .5563771226792E-04
 8000      8     5     14     5        13  .1023706678663E+05  .6894148194495E-06
 9000      8     5     14     5        15  .1151670013496E+05  .3989421912019E-07
10000     12     7     19     6        23  .1279633348329E+05  .2881809239825E-04
```

```
-------------------------------------------------------------------------------
TOTAL    109    64    178    59      1.17 (seconds)    proc= 58.72%
```

17 *** CG Algorithm ***. Function:Generalized Tridiagonal 2

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	44	17	74	28	13	.6263371020339E-13	.2388364609818E-05
2000	54	17	85	28	28	.9584127765254E+00	.2167772395941E-05
3000	53	21	81	25	41	.9584127765254E+00	.1976405501129E-05
4000	60	24	91	28	63	.1215078813006E+01	.2934035170790E-05
5000	56	19	86	27	73	.9584127765254E+00	.2876300508042E-05
6000	65	29	101	33	104	.9584127765254E+00	.2229073878778E-05
7000	61	25	95	31	113	.9584127765256E+00	.3079816446280E-05
8000	58	20	90	29	124	.1215078813006E+01	.3242706606919E-05
9000	62	23	98	33	149	.2852933237635E+01	.1456927637169E-05
10000	61	24	95	31	161	.2852933237635E+01	.2447239833469E-05
TOTAL	574	219	896	293	8.69 (seconds)	proc= 38.15%	

18 *** CG Algorithm ***. Function:Diagonal 4

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	4	2	8	3	1	.2114881523650E-29	.2480638981193E-14
2000	4	2	8	3	1	.1166392604593E-27	.1779188997502E-13
3000	4	2	8	3	2	.1214032565772E-29	.1351212984314E-13
4000	4	2	8	3	2	.1247983857767E-26	.5194724785180E-13
5000	4	2	8	3	3	.7041667987918E-27	.1342640058574E-12
6000	4	2	8	3	4	.7485373682546E-27	.7665806463845E-13
7000	4	2	8	3	4	.2243526159342E-26	.5966667746392E-12
8000	4	2	8	3	5	.8143003168436E-26	.1049955667889E-11
9000	6	3	11	4	7	.2537281737712E-22	.7507180385222E-11
10000	6	3	11	4	8	.5502392570587E-23	.3315677919871E-10
TOTAL	44	22	86	32	.37 (seconds)	proc= 50.00%	

19 *** CG Algorithm ***. Function:Diagonal 5

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	4	4	9	4	1	.2000000000000E+04	.2418892001392E-05
2000	4	4	9	4	2	.4000000000000E+04	.3403563564368E-05
3000	4	4	9	4	3	.6000000000000E+04	.4158921618594E-05
4000	4	4	9	4	4	.8000000000000E+04	.4795590083434E-05
5000	4	4	9	4	5	.1000000000000E+05	.5356574438095E-05
6000	4	4	9	4	6	.1200000000000E+05	.5863654308165E-05
7000	4	4	9	4	6	.1400000000000E+05	.6329724368534E-05
8000	4	4	9	4	8	.1600000000000E+05	.6764166683981E-05
9000	4	4	9	4	9	.1800000000000E+05	.7171365500135E-05
10000	4	4	9	4	10	.2000000000000E+05	.7556984448517E-05
TOTAL	40	40	90	40	.54 (seconds)	proc= *****%	

20 *** CG Algorithm ***. Function:HIMMELBC (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	19	10	31	11	2	.3390841356639E-11	.1593752921045E-04
2000	19	10	31	11	6	.5542042481433E-11	.2057634744356E-04
3000	19	10	31	11	7	.7718693658480E-11	.2439139527160E-04
4000	19	10	31	11	10	.9889621992410E-11	.2768333365950E-04
5000	19	10	31	11	13	.1205268485089E-10	.3061758858436E-04
6000	19	10	31	11	15	.1420954596860E-10	.3328984868226E-04
7000	19	10	31	11	18	.1635947263618E-10	.3575785430175E-04
8000	19	10	31	11	20	.1850631711838E-10	.3806443668509E-04
9000	19	10	31	11	23	.2064886183116E-10	.4023622787548E-04
10000	19	10	31	11	25	.2278733897965E-10	.4229407587702E-04

```
TOTAL    190   100    310   110      1.39 (seconds)    proc= 52.63%
```

21 *** CG Algorithm ***. Function:Generalized PSC1

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	365	132	640	241	199	.9987220414412E+03	.1295335907127E-05
2000	403	255	5602	342	3087	.1998722041482E+04	.2270636240303E-05
3000	379	172	1346	273	1124	.2998722041806E+04	.8119744349555E-05
4000	668	530	13950	612	15304	.3998722041591E+04	.4214956306670E-05
5000	571	260	1388	407	2091	.4998722041572E+04	.3544700126678E-05
6000	335	139	799	227	1438	.5998722041549E+04	.3102810024772E-05
7000	711	543	13010	641	24447	.6998722041458E+04	.1784543698746E-05
8000	482	253	2255	348	5241	.7998722041678E+04	.4663451158074E-05
9000	853	643	15236	776	38403	.8998722042529E+04	.1387723437353E-04
10000	1019	750	16448	897	44782	.9998722041770E+04	.5617983019046E-05
TOTAL	5786	3677	70674	4764	1361.16 (seconds)	proc= 63.55%	

22 *** CG Algorithm ***. Function:Extended PSC1

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	6	5	13	6	2	.3865995282465E+03	.1098462646851E-04
2000	6	5	13	6	6	.7731990564929E+03	.1492791778973E-04
3000	6	5	13	6	7	.1159798584739E+04	.1544301242271E-04
4000	7	5	15	7	12	.1546398112986E+04	.2218970719011E-06
5000	7	5	15	7	15	.1932997641232E+04	.2393650462321E-06
6000	7	5	15	7	18	.2319597169479E+04	.2822996711083E-06
7000	7	5	15	7	21	.2706196697725E+04	.2866687280573E-06
8000	7	5	15	7	23	.3092796225972E+04	.3909204277183E-06
9000	7	5	15	7	27	.3479395754218E+04	.4327304839443E-06
10000	7	5	15	7	30	.3865995282465E+04	.4395286013982E-06
TOTAL	67	50	144	67	1.61 (seconds)	proc= 74.63%	

23 *** CG Algorithm ***. Function:Extended Powell

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	57	16	109	51	10	.2118083490762E-06	.9721822829848E-05
2000	41	13	77	35	14	.2759118606042E-06	.2234793179098E-04
3000	61	17	112	50	31	.2254802890284E-06	.2357588018023E-04
4000	59	18	105	45	39	.8996215937943E-07	.7495338034581E-05
5000	72	21	137	64	62	.1295019504473E-05	.3420386127806E-04
6000	76	23	139	62	77	.2296900639693E-05	.4888697479884E-04
7000	55	16	104	48	66	.5378220794624E-06	.3451941116121E-04
8000	66	20	121	54	88	.3605060241484E-05	.5244271808977E-04
9000	62	19	119	56	97	.1937607203085E-05	.5566907114744E-04
10000	59	19	113	53	101	.5271624926383E-06	.5853640707795E-04
TOTAL	608	182	1136	518	5.85 (seconds)	proc= 29.93%	

24 *** CG Algorithm ***. Function:Extended Block-Diagonal BD1

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	55	55	87	29	8	.8488002777903E-10	.1796283674278E-04
2000	55	55	87	29	17	.2102815708808E-09	.2827305866024E-04
3000	55	55	87	29	26	.3318049319890E-09	.3551514648392E-04
4000	55	55	87	29	35	.4207345946321E-09	.3999229236069E-04
5000	54	54	85	29	42	.8360630985510E-09	.5637567654681E-04
6000	55	55	86	29	51	.6948466784832E-09	.5139450534781E-04
7000	55	55	86	29	60	.8334699091439E-09	.5628817427474E-04
8000	54	54	86	29	69	.1308646514148E-08	.7053154758560E-04
9000	54	54	86	29	77	.1596175348521E-08	.7789553175342E-04
10000	56	56	89	30	88	.7470199536862E-09	.5328908429802E-04
TOTAL	548	548	866	291	4.73 (seconds)	proc= *****%	

25 *** CG Algorithm ***. Function:Extended Maratos

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	69	34	155	65	10	-.5003121103484E+03	.2734294656591E-05
2000	71	35	160	68	22	-.1000624220696E+04	.2660732071776E-04
3000	69	34	156	67	31	-.1500936331045E+04	.2437488755897E-05
4000	66	33	151	64	40	-.2001248441393E+04	.3370415842617E-04
5000	66	33	152	64	51	-.2501560551742E+04	.9568196180342E-05
6000	69	34	159	68	63	-.3001872662090E+04	.1347617047159E-04
7000	66	33	151	65	71	-.3502184772437E+04	.4450480474068E-04
8000	69	34	157	66	84	-.4002496882786E+04	.3325083212436E-04
9000	66	33	152	64	91	-.4502808993135E+04	.1939130356651E-05
10000	66	33	152	64	102	-.5003121103484E+04	.1674387860022E-05
TOTAL	677	336	1545	655	5.65 (seconds)	proc= 49.63%	

26 *** CG Algorithm ***. Function:CLIFF (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	9	8	20	5	2	.9989330729624E+02	.1062736571190E-04
2000	11	10	23	5	3	.1997866136777E+03	.1999479551780E-05
3000	13	10	25	6	6	.2996799215455E+03	.1434557757925E-04
4000	9	7	34	8	8	.3995732281421E+03	.1254401857326E-04
5000	9	7	35	8	10	.4994665343294E+03	.5209388421336E-05
6000	9	6	22	8	9	.5993598429007E+03	.1933357275083E-04
7000	9	7	22	8	11	.6992531482890E+03	.9156231318722E-05
8000	9	7	22	8	13	.7991464551733E+03	.9797857781279E-05
9000	10	7	39	8	20	.8990397621452E+03	.1115370336804E-04
10000	9	7	37	8	21	.9989330685643E+03	.6025786158701E-05
TOTAL	97	76	279	72	1.03 (seconds)	proc= 78.35%	

27 *** CG Algorithm ***. Function:Quadratic Diagonal Perturbed

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	125	23	219	93	18	.3523182156672E-10	.5791207181158E-05
2000	226	37	398	171	65	.2455247739378E-10	.3155086575733E-05
3000	278	56	485	206	121	.1871633672947E-10	.3500529406420E-05
4000	289	54	502	212	166	.3263481155791E-10	.2802028956376E-04
5000	411	74	721	309	299	.2049385580020E-10	.2094702093878E-05
6000	374	73	657	282	325	.1532717710883E-10	.9347106571782E-05
7000	379	72	660	280	383	.1906763285100E-10	.9153903261584E-05
8000	418	82	727	308	482	.4146881010066E-10	.3193688445211E-04
9000	441	81	775	333	575	.3515611475965E-10	.2305842460860E-04
10000	426	78	747	320	617	.5883684143889E-10	.7099142508991E-04
TOTAL	3367	630	5891	2514	30.51 (seconds)	proc= 18.71%	

28 *** CG Algorithm ***. Function:WOODS (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	24	9	47	21	5	.7156677880877E-12	.7417336322281E-05
2000	31	13	58	25	15	.1806054429677E-12	.1809319180666E-04
3000	25	10	49	22	19	.1381640267565E-09	.2612783408083E-04
4000	26	10	50	22	25	.7430018430487E-13	.1200672164585E-04
5000	28	12	54	24	34	.4625203845774E-13	.2949446853670E-05
6000	26	11	50	22	37	.2489340853974E-09	.1893024411700E-04
7000	27	11	51	22	45	.3995748832658E-10	.4461655456061E-04
8000	24	9	47	21	47	.8743596216107E-14	.1784249023216E-05
9000	31	13	58	25	67	.2356311490874E-09	.2111214184295E-04
10000	23	10	45	20	56	.2339854363263E-12	.8024603364270E-05
TOTAL	265	108	509	224	3.50 (seconds)	proc= 40.75%	

29 *** CG Algorithm ***. Function:Extended Hiebert

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	77	49	169	77	12	.2262781120747E-12	.5447919636860E-06
2000	78	49	165	77	23	.2542493526868E-08	.2006721241101E-04
3000	79	50	171	78	36	.2204215781359E-13	.1514342167559E-04
4000	79	50	166	78	47	.1249196325690E-14	.3591636300793E-05
5000	77	49	157	76	57	.2023210891289E-10	.2132456014484E-05
6000	79	50	165	78	71	.2037620745760E-15	.1455990651621E-05
7000	79	50	164	78	82	.1742034584407E-14	.4257212430375E-05
8000	79	50	165	78	94	.9915391413988E-14	.1015668056599E-04
9000	79	50	164	78	106	.2895008851402E-14	.5488096493847E-05
10000	79	50	169	78	120	.8511431030369E-13	.2975757053380E-04
TOTAL	785	497	1655	776	6.48 (seconds)	proc= 63.31%	

30 *** CG Algorithm ***. Function:Quadratic QF1

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	343	93	537	193	32	-.4999999995816E-03	.2212886024792E-05
2000	506	148	792	285	94	-.2499999994730E-03	.2840447223215E-05
3000	622	173	961	338	174	-.1666666663078E-03	.3859276484549E-05
4000	897	250	1396	498	335	-.1249999997422E-03	.3356238028348E-05
5000	740	207	1157	416	346	-.9999999992524E-04	.4289442410525E-05
6000	816	220	1281	464	458	-.8333333329492E-04	.4955214017104E-05
7000	992	278	1560	567	648	-.7142857091603E-04	.2852619449506E-05
8000	1053	285	1651	597	787	-.6249999987330E-04	.6436126229515E-05
9000	1111	313	1748	636	933	-.5555555518272E-04	.4453682401886E-05
10000	1132	331	1763	630	1056	-.4999999993776E-04	.1718523324498E-05
TOTAL	8212	2298	12846	4624	48.63 (seconds)	proc= 27.98%	

31 *** CG Algorithm ***. Function:Extended Quadratic Penalty QP1

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	637	635	21129	637	726	.3990006250000E+04	.7456914915273E-06
2000	2001	1998	66948	2000	4615	.7990003125000E+04	.3349623290714E-05
3000	8	6	22	8	4	.1199000208333E+05	.6200238632329E-06
4000	2001	1998	66995	2000	9228	.1599000156250E+05	.4571753020474E-05
5000	9	8	26	8	8	.1999000125000E+05	.3847672623095E-06
6000	38	36	755	38	163	.2399000104167E+05	.9707353166239E-06
7000	43	41	899	43	227	.2799000089285E+05	.9221663265891E-06
8000	2001	1999	67065	2000	18542	.3199000078125E+05	.1224368174560E-04
9000	42	41	901	42	291	.3599000069444E+05	.9250898320245E-06
10000	30	28	654	29	234	.3999000062499E+05	.9754690208718E-06
TOTAL	6810	6790	225394	6805	340.38 (seconds)	proc= 99.71%	

32 *** CG Algorithm ***. Function:Extended Quadratic Penalty QP2

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	37	20	90	34	10	.1243246755841E-16	.1811598128861E-07
2000	37	19	87	33	18	.8820591095977E-14	.1878360201545E-06
3000	45	22	106	43	33	.1380107541224E-15	.3363339255193E-07
4000	43	21	108	42	45	.2736177973349E-17	.3335931120460E-08
5000	43	22	106	41	55	.6710859420901E-13	.5181066424561E-06
6000	41	19	112	39	69	.2744871064071E-15	.4662085520786E-07
7000	47	25	104	43	79	.1093632001036E-16	.7494188054025E-08
8000	42	21	105	41	87	.1372305877994E-16	.1481726180423E-06
9000	42	21	111	41	102	.3569410470195E-15	.7557105285176E-06
10000	42	21	107	41	110	.2714982845412E-15	.6590841042872E-06
TOTAL	419	211	1036	398	6.08 (seconds)	proc= 50.36%	

33 *** CG Algorithm ***. Function:Quadratic QF2

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	394	110	600	205	81	-.1000124968766E+01	.2597329437053E-05
2000	548	152	850	300	220	-.1000062492189E+01	.2481755290068E-05
3000	606	184	939	331	361	-.1000041663195E+01	.1883917016468E-05
4000	826	242	1282	453	641	-.1000031248047E+01	.2598034964895E-05
5000	924	264	1442	514	902	-.1000024998750E+01	.2412570425135E-05
6000	987	290	1561	567	1150	-.1000020832465E+01	.1408073226416E-05
7000	1209	334	1909	697	1622	-.1000017856505E+01	.2574764797638E-05
8000	1261	354	1985	722	1868	-.1000015624512E+01	.2857434366382E-05
9000	1433	412	2267	824	2412	-.1000013888503E+01	.3634850149549E-05
10000	1388	447	2202	788	2570	-.1000012499688E+01	.2613346785030E-05
TOTAL	9576	2789	15037	5401	118.27 (seconds)	proc= 29.12%	

34 *** CG Algorithm ***. Function:Extended EP1

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	2	2	5	2	0	.7931762881473E+04	.5427376174645E-08
2000	3	3	6	2	1	.1586352576295E+05	.1185543339228E-08
3000	3	3	6	2	1	.2379528864442E+05	.2225548739908E-10
4000	3	3	6	2	1	.3172705152589E+05	.2620573871782E-10
5000	3	3	6	2	2	.3965881440736E+05	.1529755802112E-09
6000	3	3	6	2	3	.4759057728884E+05	.2073590669368E-09
7000	3	3	6	2	2	.5552234017031E+05	.1121914841985E-09
8000	2	2	4	1	2	.6345410305178E+05	.3908987923302E-04
9000	3	3	6	2	4	.7138586593325E+05	.2528642697408E-09
10000	4	4	7	2	5	.7931762881473E+05	.6092834570204E-10
TOTAL	29	29	58	19	.21 (seconds)	proc= *****%	

35 *** CG Algorithm ***. Function:Extended Tridiagonal 2

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	32	12	50	17	4	.3893393944764E+03	.3549011845256E-05
2000	37	16	92	22	13	.7790685180764E+03	.4095705744457E-05
3000	35	17	58	22	14	.1168797641676E+04	.4158771314811E-05
4000	36	18	58	20	22	.1558526765277E+04	.2605429512833E-05
5000	35	15	60	21	25	.1948255888877E+04	.2990944710324E-05
6000	33	13	52	17	27	.2337985012477E+04	.2070301832208E-05
7000	33	17	56	19	33	.2727714136076E+04	.3003431519622E-05
8000	38	20	67	25	44	.3117443259676E+04	.2562316044260E-05
9000	38	20	139	27	71	.3507172383276E+04	.4851641061213E-05
10000	36	18	63	21	52	.3896901506876E+04	.1804828125339E-05
TOTAL	353	166	695	211	3.05 (seconds)	proc= 47.03%	

36 *** CG Algorithm ***. Function:BDQRTIC (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	2001	1865	55046	1962	10874	.3983817950577E+04	.2347283773710E-04
2000	2001	1854	52468	1959	20768	.7989427682541E+04	.8292356931146E-05
3000	2001	1877	53492	1977	31925	.1199503741451E+05	.3763713357458E-04
4000	2001	1873	53420	1967	42389	.1600064714647E+05	.2324012943182E-04
5000	2001	1887	53133	1974	52651	.2000625687843E+05	.1188825768687E-04
6000	2001	1873	53165	1957	63449	.2401186661040E+05	.4151644023266E-04
7000	2001	1903	53961	1980	74829	.2801747634236E+05	.2467801684670E-04
8000	2001	1857	52216	1968	82880	.3202308607433E+05	.2315445872088E-03
9000	2001	1853	49201	1911	88043	.3602869580629E+05	.1048577119236E-03
10000	2001	1868	52669	1980	104528	.4003430553826E+05	.1383821648967E-03
TOTAL	20010	18710	528771	19635	5723.36 (seconds)	proc= 93.50%	

37 *** CG Algorithm ***. Function:TRIDIA (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	995	261	1571	575	137	.3008572813189E-12	.4152176707637E-05
2000	2001	523	3158	1157	550	.2754727260613E-10	.1887033832465E-04
3000	2001	552	3117	1116	820	.2213697176599E-09	.4540664761475E-04
4000	2001	570	3091	1090	1091	.2240352354757E-08	.3816592087961E-03
5000	2001	562	3139	1138	1369	.1844460750993E-05	.1242948454162E+00
6000	2001	543	3124	1123	1639	.1218615665869E-05	.1058789033510E-01
7000	2001	543	3151	1150	1917	.1270944284288E-05	.6330134921744E-01
8000	2001	526	3125	1124	2185	.2846437408542E-03	.9541117072690E-01
9000	2001	574	3105	1104	2449	.4450088719374E-05	.1187192826863E-01
10000	2001	552	3169	1168	2742	.1896772409414E-03	.6253010211445E-01
TOTAL	19004	5206	29750	10745	148.99 (seconds)	proc= 27.39%	

38 *** CG Algorithm ***. Function:ARWHEAD (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	8	6	57	7	10	.0000000000000E+00	.4188453008996E-06
2000	9	6	37	7	15	.0000000000000E+00	.1534715352018E-06
3000	15	8	31	14	20	.0000000000000E+00	.1343223566620E-06
4000	7	5	35	6	27	.0000000000000E+00	.6794397979891E-06
5000	7	5	35	6	34	.0000000000000E+00	.5061882640597E-06
6000	6	4	14	5	18	.0000000000000E+00	.8206033747649E-06
7000	17	11	95	16	130	.0000000000000E+00	.1711854448763E-06
8000	4	3	10	3	17	.0000000000000E+00	.1394225206478E-06
9000	4	3	10	3	19	.0000000000000E+00	.1234208244146E-06
10000	7	5	35	6	68	.0000000000000E+00	.9766274952916E-06
TOTAL	84	56	359	73	3.58 (seconds)	proc= 66.67%	

39 *** CG Algorithm ***. Function:NONDIA (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	14	8	28	12	4	.1153669004027E-16	.4309165779284E-08
2000	9	6	19	7	6	.1008386104002E-25	.2018385458768E-11
3000	10	6	21	8	9	.2386744577308E-18	.5355296952066E-06
4000	7	4	14	5	8	.3943912996129E-09	.1261809629097E-04
5000	7	4	14	5	11	.1675203498273E-09	.7355986142025E-05
6000	7	4	14	5	13	.7267449121380E-10	.4423105664141E-05
7000	7	4	14	5	14	.1430331069212E-09	.5745116886938E-05
8000	7	4	14	5	17	.4318597556119E-10	.2953025459280E-05
9000	7	4	14	5	19	.1440611112643E-10	.1608054268915E-05
10000	7	4	14	5	22	.8894779161501E-11	.1198740719278E-05
TOTAL	82	48	166	62	1.23 (seconds)	proc= 58.54%	

40 *** CG Algorithm ***. Function:NONDQUAR (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	1464	225	2744	1262	436	.6062844693367E-05	.4437965452266E-05
2000	1765	321	3292	1493	1045	.4926098071524E-05	.3888520787881E-05
3000	1783	303	3391	1547	1612	.4873091582812E-05	.3354712835573E-05
4000	1719	299	3248	1498	2066	.5216980307443E-05	.4164802956065E-05
5000	1673	320	3133	1427	2493	.6558513969162E-05	.5351557681532E-05
6000	1986	352	3754	1707	3575	.5133252228286E-05	.4683113517725E-05
7000	1704	303	3250	1487	3601	.5573967969565E-05	.4619108581560E-05
8000	2001	402	3766	1707	4786	.5148160079108E-05	.5323782104675E-05
9000	1760	307	3358	1536	4775	.5615159871664E-05	.4702818385488E-05
10000	1907	358	3656	1661	5773	.5466194958179E-05	.4017414175275E-05
TOTAL	17762	3190	33592	15325	301.62 (seconds)	proc= 17.96%	

41 *** CG Algorithm ***. Function:DQDRTIC (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	7	1	15	7	2	.4304930177119E-14	.2445674436961E-06
2000	7	0	15	7	4	.1673587748166E-12	.1484941320764E-05
3000	10	0	21	10	7	.4122647634213E-18	.1819807516839E-07
4000	10	0	21	10	11	.9092450731066E-16	.2702830110164E-06
5000	10	0	21	10	13	.1446529858160E-16	.1078134955328E-06
6000	10	0	21	10	15	.1835791259998E-14	.1214533925283E-05
7000	10	0	21	10	19	.3855405395119E-15	.5566251264335E-06
8000	6	2	13	6	13	.3024007111548E-14	.9651991983860E-06
9000	6	2	13	6	14	.7087686833261E-17	.4696224885859E-07
10000	6	2	13	6	16	.3816450633735E-16	.1087370788431E-06
TOTAL	82	7	174	82	1.14 (seconds)	proc= 8.54%	

42 *** CG Algorithm ***. Function:EG2 (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	2001	1885	61052	1993	2638	-.9989473889673E+03	.7753375330280E-04
2000	267	115	614	254	96	-.1998947386161E+04	.2456829173481E-04
3000	2001	1901	61725	1986	8028	-.2998946507104E+04	.3402125724260E-03
4000	2001	1883	60748	1991	10578	-.3998946671785E+04	.3216825547680E-03
5000	2001	1895	61356	1993	13339	-.4998944947800E+04	.4651154159658E-03
6000	2001	1881	60974	1990	15901	-.5998945826947E+04	.3234858962177E-03
7000	2001	1902	62087	1984	18843	-.6998943746074E+04	.3068277312155E-02
8000	2001	1820	56439	1981	19732	-.7998946338552E+04	.3296358672888E-03
9000	2001	1918	62835	1995	24640	-.8998936808059E+04	.1437911716213E-02
10000	2001	1891	61227	1987	26582	-.9998943864397E+04	.2510587094924E-02
TOTAL	18276	17091	549057	18154	1403.77 (seconds)	proc= 93.52%	

43 *** CG Algorithm ***. Function:DIXMAANA (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	6	4	12	5	4	.1000000000000E+01	.1093741231957E-05
2000	6	4	12	5	6	.1000000000001E+01	.2616351420448E-05
3000	6	3	12	5	11	.1000000000003E+01	.3338775205746E-05
4000	6	3	12	5	13	.1000000000004E+01	.3904085845430E-05
5000	6	4	12	5	17	.1000000000005E+01	.4738649862496E-05
6000	6	3	12	5	20	.1000000000007E+01	.5215732841113E-05
7000	6	3	12	5	23	.1000000000007E+01	.5635016474999E-05
8000	6	4	12	5	28	.1000000000010E+01	.6300179253025E-05
9000	6	3	12	5	31	.1000000000011E+01	.6663508930805E-05
10000	6	3	12	5	34	.1000000000011E+01	.7011593756423E-05
TOTAL	60	34	120	50	1.87 (seconds)	proc= 56.67%	

44 *** CG Algorithm ***. Function:DIXMAANB (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	10	10	17	6	5	.1000000000000E+01	.1258664703360E-05
2000	11	11	19	7	10	.1000000000000E+01	.4260436932232E-06
3000	11	10	19	7	17	.1000000000000E+01	.1612844149183E-06
4000	11	11	19	7	22	.1000000000000E+01	.8273191561284E-06
5000	11	11	19	7	27	.1000000000000E+01	.1267939019051E-05
6000	11	10	19	7	33	.1000000000001E+01	.1532546149982E-05
7000	11	11	19	7	38	.1000000000001E+01	.1883698514640E-05
8000	11	10	19	7	44	.1000000000001E+01	.2153442874006E-05
9000	11	10	19	7	49	.1000000000001E+01	.2331971344383E-05
10000	11	10	19	7	55	.1000000000000E+01	.1514379346675E-05
TOTAL	109	104	188	69	3.00 (seconds)	proc= 95.41%	

45 *** CG Algorithm ***. Function:DIXMAANC (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	14	14	25	10	7	.1000000000000E+01	.4095121828782E-06
2000	15	14	26	10	15	.1000000000000E+01	.6715103308580E-07
3000	15	13	26	10	22	.1000000000000E+01	.1430064661758E-06
4000	14	13	24	9	28	.1000000000007E+01	.5407285026748E-05
5000	14	13	24	9	35	.1000000000005E+01	.4683193615119E-05
6000	14	13	24	9	41	.1000000000005E+01	.4496101968629E-05
7000	15	15	26	10	52	.1000000000000E+01	.1846653073044E-06
8000	14	12	24	9	55	.1000000000000E+01	.7585191827777E-06
9000	14	12	24	9	63	.1000000000001E+01	.2003090931545E-05
10000	15	15	26	10	75	.1000000000000E+01	.1769896699223E-06
TOTAL	144	134	249	95	3.93 (seconds)	proc= 93.06%	

46 *** CG Algorithm ***. Function:DIXMAANE (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	210	61	325	114	113	.1000000000082E+01	.3888146865925E-05
2000	274	77	427	152	297	.1000000000592E+01	.4234626880448E-05
3000	349	93	550	200	573	.1000000000245E+01	.5939870505610E-05
4000	370	101	587	216	814	.1000000001128E+01	.7121808057886E-05
5000	483	135	763	278	1323	.1000000000831E+01	.2718781236245E-05
6000	543	146	850	304	1773	.1000000001548E+01	.5437794766379E-05
7000	614	175	960	344	2334	.1000000000073E+01	.4214848631181E-05
8000	579	163	906	326	2517	.1000000001797E+01	.8025414579243E-05
9000	624	175	976	351	3051	.1000000000071E+01	.5351053800023E-05
10000	623	175	974	350	3382	.1000000000720E+01	.5637029810917E-05
TOTAL	4669	1301	7318	2635	161.77 (seconds)	proc= 27.86%	

47 *** CG Algorithm ***. Function:Partial Perturbed Quadratic

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	221	57	357	135	337	.2073671586920E-12	.8777666299207E-05
2000	237	53	408	170	1490	.1270235440844E-12	.6979835904835E-05
3000	231	47	393	161	3190	.3453338224716E-12	.1201059396510E-04
4000	142	28	241	98	3461	.3558916562280E-12	.1514780293507E-04
5000	85	18	143	57	3209	.3379588705937E-12	.1144676359035E-04
6000	52	10	95	42	3066	.3009503710001E-12	.1373962434569E-04
7000	37	8	65	27	2858	.1539099168252E-12	.2349746791258E-04
8000	25	2	48	22	2754	.8641622839433E-13	.1754593278000E-04
9000	29	7	51	21	3705	.6473533933538E-13	.3852082127831E-04
10000	20	1	40	19	3585	.2404459368943E-13	.1261945540001E-04
TOTAL	1079	231	1841	752	276.55 (seconds)	proc= 21.41%	

48 *** CG Algorithm ***. Function:Broyden Tridiagonal

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	40	19	65	21	4	.7093952135489E-13	.2205714142342E-05
2000	67	25	109	39	13	.3970671034876E+00	.1832437063301E-05
3000	75	26	118	40	22	.3970671034876E+00	.2159266915596E-05
4000	77	27	118	38	30	.3970671034876E+00	.2806959798899E-05
5000	60	22	96	33	29	.3970671034879E+00	.2828378295262E-05
6000	81	35	127	43	48	.3970671034876E+00	.2133059023457E-05
7000	82	28	134	49	56	.3970671034878E+00	.2879950020113E-05
8000	73	21	117	41	57	.3970671034875E+00	.1302627027753E-05
9000	75	28	123	45	66	.3970671034876E+00	.2573858729025E-05
10000	75	29	122	44	74	.3970671034876E+00	.2239845255031E-05
TOTAL	705	260	1129	393	3.99 (seconds)	proc= 36.88%	

49 *** CG Algorithm ***. Function:Almost Perturbed Quadratic

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	310	85	480	169	29	.6794845390349E-13	.3804671006598E-05
2000	496	138	776	279	93	.5612104380962E-13	.2316397762910E-05
3000	698	188	1081	382	197	.1605008013748E-13	.4524032330281E-05
4000	693	182	1072	378	260	.5096139789684E-13	.5615559564369E-05
5000	762	214	1190	427	358	.1832028321211E-12	.3518490583668E-05
6000	869	241	1342	472	488	.8357770878384E-13	.3083327616253E-05
7000	913	253	1412	498	599	.1857375724020E-12	.6594585715172E-05
8000	1161	338	1796	634	871	.6291880737422E-13	.3775253855408E-05
9000	1125	297	1767	641	951	.4290488131025E-13	.2083007724273E-05
10000	1037	288	1623	585	971	.2530953146676E-12	.3701733060954E-05
TOTAL	8064	2224	12539	4465	48.17 (seconds)	proc= 27.58%	

50 *** CG Algorithm ***. Function:Tridiagonal Perturbed Quadratic

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	391	115	607	215	54	.1976535581963E-12	.3565270758280E-05
2000	483	134	766	282	133	.6273713388556E-13	.4060266259354E-05
3000	613	169	960	346	254	.3192065574111E-13	.5004528793650E-05
4000	668	187	1047	378	368	.1651745373195E-12	.6393351596591E-05
5000	797	210	1249	451	549	.3489879455247E-13	.4371420416271E-05
6000	876	241	1363	486	721	.7632011652437E-13	.3112700125466E-05
7000	926	256	1454	527	893	.2490533353027E-12	.3374141366112E-05
8000	928	246	1453	524	1021	.2103478870958E-12	.4027236008959E-05
9000	1054	287	1633	578	1300	.5522162650917E-13	.4893518113144E-05
10000	1264	341	1962	697	1733	.2506657283094E-12	.3233526415605E-05
TOTAL	8000	2186	12494	4484	70.26 (seconds)	proc= 27.32%	

51 *** CG Algorithm ***. Function:EDENSCH (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	34	18	173	22	21	.6003284592021E+04	.1217919164899E-05
2000	39	25	350	30	80	.1200328459202E+05	.2877554402891E-06
3000	58	44	783	44	259	.1800328459202E+05	.9272400777760E-06
4000	31	19	274	27	124	.2400328459202E+05	.1158791360216E-05
5000	66	50	1231	59	653	.3000328459202E+05	.8393413461615E-06
6000	58	47	1029	53	666	.3600328459202E+05	.2373416240403E-06
7000	46	34	509	38	396	.4200328459202E+05	.6072344835536E-06
8000	61	48	875	49	747	.4800328459202E+05	.8472180477628E-06
9000	32	17	273	27	281	.5400328459202E+05	.2092757743416E-05
10000	62	49	1084	54	1147	.6000328459202E+05	.9757842534104E-06
TOTAL	487	351	6581	403	43.74 (seconds)	proc= 72.07%	

52 *** CG Algorithm ***. Function:VARDIM (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	16	16	43	16	4	.4542113180843E-28	.1347904029350E-13
2000	17	17	45	17	8	.1221447080703E-24	.6989841430828E-12
3000	19	19	50	19	14	.6099041110861E-26	.1561927157183E-12
4000	17	17	49	17	17	.5049982916308E-23	.4494433408699E-11
5000	14	14	46	14	20	.1783133794591E-26	.8445433783035E-13
6000	18	18	49	18	26	.5473084912949E-25	.4678925053022E-12
7000	20	20	53	20	33	.7092893796213E-23	.5326497459387E-11
8000	19	19	65	19	44	.2382514694719E-22	.9762201994875E-11
9000	20	20	54	18	43	.1918029009383E-26	.8759061614998E-13
10000	17	17	52	17	45	.2711424110826E-22	.1041426734980E-10
TOTAL	177	177	506	175	2.54 (seconds)	proc= *****%	

53 *** CG Algorithm ***. Function:STAIRCASE S1

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2

1000	2001	532	3149	1148	273	.3543890958547E-04	.7007591758572E-04
2000	2001	541	3140	1139	544	.4167471993326E-03	.1839543670673E-02
3000	2001	544	3130	1128	815	.1406494175360E-02	.1133052692129E-02
4000	2001	548	3136	1134	1089	.2458324453066E-02	.3157675022266E-02
5000	2001	544	3130	1128	1359	.3695221147937E-02	.6283176210962E-03
6000	2001	538	3135	1134	1629	.3385457947930E-02	.8338383864589E-03
7000	2001	550	3139	1138	1901	.6240979305818E-02	.7703853608503E-03
8000	2001	569	3124	1122	2170	.8520605920993E-02	.9339753201712E-03
9000	2001	551	3139	1137	2455	.1939443672503E-01	.1298279249634E-02
10000	2001	529	3149	1147	2728	.6348617338788E-02	.5752599012559E-03
TOTAL	20010	5446	31371	11355	149.63 (seconds)	proc= 27.22%	

54 *** CG Algorithm ***. Function:LIARWHD (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	21	11	47	21	4	.7715003742534E-14	.1770644550306E-06
2000	20	11	42	20	8	.8200992438378E-11	.5812456815644E-05
3000	21	10	43	19	13	.1287500488584E-17	.2487718257623E-06
4000	23	12	46	21	18	.1035893840305E-13	.2039641183577E-06
5000	25	12	54	23	27	.2190821189956E-10	.9389909019453E-05
6000	23	14	50	22	29	.2638463624076E-10	.1029066663129E-04
7000	22	12	50	20	34	.2777465231424E-18	.1055237074364E-08
8000	20	12	40	18	32	.6913816011917E-10	.1664649218204E-04
9000	20	11	45	19	38	.2123219687973E-21	.2927150828138E-10
10000	16	10	39	15	37	.1369804702977E-14	.7408091633530E-07
TOTAL	211	115	456	198	2.40 (seconds)	proc= 54.50%	

55 *** CG Algorithm ***. Function:Diagonal 6

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	4	4	9	4	0	.0000000000000E+00	.1635068493867E-06
2000	4	4	9	4	2	.4440892098501E-12	.2278951214314E-06
3000	4	4	9	4	2	.0000000000000E+00	.2772844707468E-06
4000	4	4	9	4	2	.0000000000000E+00	.3189158539001E-06
5000	4	4	9	4	4	.0000000000000E+00	.3555910886605E-06
6000	4	4	9	4	4	.0000000000000E+00	.3887465034055E-06
7000	4	4	9	4	4	.0000000000000E+00	.4192350669372E-06
8000	4	4	9	4	6	.0000000000000E+00	.4476124916258E-06
9000	4	4	9	4	6	.0000000000000E+00	.4742646709370E-06
10000	4	4	9	4	7	.0000000000000E+00	.4994725844183E-06
TOTAL	40	40	90	40	.37 (seconds)	proc= *****%	

56 *** CG Algorithm ***. Function:DIXON3DQ (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	2001	550	3124	1123	247	.1045498806971E-02	.1704092498022E-03
2000	2001	523	3138	1137	463	.1295624148936E-01	.6662008239559E-03
3000	2001	553	3119	1118	634	.1631160133500E-01	.2147777976671E-02
4000	2001	559	3132	1131	770	.1297076649269E-01	.7345516580602E-03
5000	2001	559	3132	1131	886	.1297076649269E-01	.7345516580602E-03
6000	2001	559	3132	1131	1003	.1297076649269E-01	.7345516580602E-03
7000	2001	559	3132	1131	1117	.1297076649269E-01	.7345516580602E-03
8000	2001	559	3132	1131	1235	.1297076649269E-01	.7345516580602E-03
9000	2001	559	3132	1131	1350	.1297076649269E-01	.7345516580602E-03
10000	2001	559	3132	1131	1465	.1297076649269E-01	.7345516580602E-03
TOTAL	20010	5539	31305	11295	91.70 (seconds)	proc= 27.68%	

57 *** CG Algorithm ***. Function:ENGVAL1 (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2

1000	55	39	1062	50	12	.1108194718785E+04	.9928538526532E-06
2000	45	31	402	32	13	.2218313143943E+04	.1277141853770E-05
3000	61	49	954	49	34	.3328431569101E+04	.9673649703915E-06
4000	28	15	48	17	11	.4438549994258E+04	.9809872979254E-06
5000	48	36	547	37	39	.5548668419416E+04	.9894105443342E-06
6000	50	36	704	38	53	.6658786844573E+04	.1075638312084E-05
7000	51	39	701	42	62	.7768905269731E+04	.9164950296034E-06
8000	23	11	43	17	19	.8879023694889E+04	.8502344853154E-06
9000	30	18	58	23	26	.9989142120047E+04	.7451145666769E-06
10000	23	11	44	18	23	.1109926054521E+05	.1738797735076E-05
TOTAL	414	285	4563	323	2.92 (seconds)	proc= 68.84%	

58 *** CG Algorithm ***. Function:Extended DENSCHNA (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	9	6	18	8	2	.1270188962557E-18	.1152915175858E-08
2000	9	6	17	7	4	.1800448647615E-09	.1668980588780E-04
3000	9	6	17	7	7	.3002758287178E-10	.6840716468237E-05
4000	9	6	17	7	8	.6021365192702E-11	.7610876134615E-05
5000	9	6	17	7	11	.6511465439970E-11	.7965544964212E-05
6000	9	6	17	7	12	.6429276014233E-11	.7946040465002E-05
7000	9	6	17	7	16	.6135587061715E-11	.7782637285937E-05
8000	9	6	17	7	17	.5786541987843E-11	.7572012799811E-05
9000	9	6	17	7	19	.5444390071219E-11	.7354877628624E-05
10000	9	6	17	7	21	.5131381849030E-11	.7147948141199E-05
TOTAL	90	60	171	71	1.17 (seconds)	proc= 66.67%	

59 *** CG Algorithm ***. Function:Extended DENSCHNC (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	12	8	24	10	6	.2545843807447E-11	.3090265936528E-05
2000	13	8	27	11	12	.1823943069809E-10	.8272888026625E-05
3000	12	8	25	10	17	.2189395064751E-17	.1219821444460E-07
4000	13	8	26	10	23	.8172563283407E-12	.1750993766525E-05
5000	15	10	34	11	38	.2090496858201E-09	.2800794258802E-04
6000	14	9	30	11	40	.3316068762984E-13	.1504361766884E-05
7000	14	9	29	11	45	.3321106550207E-10	.4736433641944E-04
8000	17	12	30	10	56	.2211581537169E-09	.5441947470071E-04
9000	15	10	29	11	59	.2763513525920E-14	.4342830918227E-06
10000	11	6	23	10	52	.7213837640602E-11	.5202037385882E-05
TOTAL	136	88	277	105	3.48 (seconds)	proc= 64.71%	

60 *** CG Algorithm ***. Function:Extended DENSCHNB (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	6	4	13	6	1	.5603754888526E-10	.1870188465267E-04
2000	6	4	13	6	3	.4897688186137E-10	.1764394619363E-04
3000	6	4	13	6	4	.4961908409412E-10	.1783502309656E-04
4000	6	4	13	6	6	.5193879332770E-10	.1829463040921E-04
5000	5	4	11	5	6	.6613974094029E-09	.5478369187812E-04
6000	5	4	11	5	7	.7056665591097E-09	.5653438976843E-04
7000	5	4	11	5	9	.7506795645409E-09	.5826704799147E-04
8000	5	4	11	5	9	.7959000184903E-09	.5996099051434E-04
9000	5	4	11	5	11	.8410712893521E-09	.6160889979427E-04
10000	5	4	11	5	12	.8860663480858E-09	.6320918840629E-04
TOTAL	54	40	118	54	.68 (seconds)	proc= 74.07%	

61 *** CG Algorithm ***. Function:Extended DENSCHNF (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	19	16	34	14	8	.1024631140251E-11	.1422271814476E-04

2000	16	13	31	14	14	.1496416314404E-11	.1387853495137E-04
3000	20	19	33	12	23	.9604942671775E-12	.1132963051535E-04
4000	17	14	30	12	27	.1452981585659E-11	.2953741459468E-04
5000	17	16	28	10	33	.3075032549179E-11	.2397002044770E-04
6000	18	16	33	14	45	.3151938176579E-11	.2042590227027E-04
7000	18	16	31	12	51	.1003741942116E-10	.5018151264448E-04
8000	17	15	30	12	56	.1285888970618E-11	.1783453178897E-04
9000	18	16	31	12	65	.8875899474411E-13	.3352282283528E-05
10000	18	13	32	13	73	.1225837007035E-10	.4618923586246E-04
TOTAL	178	154	313	125	3.95 (seconds)	proc= 86.52%	

62 *** CG Algorithm ***. Function:SINQUAD (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	128	55	281	116	37	.3096917169234E-04	.2799894996750E-04
2000	223	100	518	213	133	.6041130660295E-05	.5697983244584E-05
3000	226	116	515	204	200	.5697098999371E-04	.2597545622938E-04
4000	411	172	930	391	485	.3011141659381E-05	.2513005015017E-05
5000	261	140	611	244	395	.1530414673859E-04	.7257033479373E-05
6000	341	149	782	327	611	.6543991547382E-05	.3504069707487E-05
7000	400	171	934	379	852	.3406716766085E-04	.1140077274796E-04
8000	269	132	628	260	658	.4336139928129E-04	.1293252988947E-04
9000	183	106	416	176	482	.3530935985222E-04	.1034407062242E-04
10000	435	234	1001	415	1303	.1020250577663E-04	.3760583847818E-05
TOTAL	2877	1375	6616	2725	51.56 (seconds)	proc= 47.79%	

63 *** CG Algorithm ***. Function:BIGGSB1 (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	2001	541	3133	1132	251	.9552200854945E-03	.4377320474512E-03
2000	2001	547	3143	1142	460	.1861786095681E-02	.5593242336935E-03
3000	2001	547	3144	1143	636	.2168250098807E-02	.2410189489176E-03
4000	2001	544	3149	1148	771	.1929735656243E-02	.5400151850877E-02
5000	2001	544	3149	1148	886	.1929735656243E-02	.5400151850877E-02
6000	2001	544	3149	1148	1003	.1929735656243E-02	.5400151850877E-02
7000	2001	544	3149	1148	1118	.1929735656243E-02	.5400151850877E-02
8000	2001	544	3149	1148	1233	.1929735656243E-02	.5400151850877E-02
9000	2001	544	3149	1148	1349	.1929735656243E-02	.5400151850877E-02
10000	2001	544	3149	1148	1465	.1929735656243E-02	.5400151850877E-02
TOTAL	20010	5443	31463	11453	91.72 (seconds)	proc= 27.20%	

64 *** CG Algorithm ***. Function:Extended Block-Diagonal BD2

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	11	7	21	9	4	.1201504178908E-12	.2768041898716E-05
2000	12	8	23	10	8	.1188871802526E-11	.8660407985967E-05
3000	12	8	23	10	12	.2506060793180E-11	.1258285386328E-04
4000	12	8	23	10	15	.4101939812112E-11	.1611078094135E-04
5000	12	8	23	10	20	.5907451091142E-11	.1934706022852E-04
6000	12	8	23	10	24	.7878075233067E-11	.2235481467893E-04
7000	12	8	23	10	28	.9983129711670E-11	.2517688921749E-04
8000	12	8	23	10	31	.1220040953079E-10	.2784411023541E-04
9000	12	8	23	10	36	.1451322718794E-10	.3037955709342E-04
10000	12	8	23	10	39	.1690866835358E-10	.3280112123224E-04
TOTAL	119	79	228	99	2.17 (seconds)	proc= 66.39%	

65 *** CG Algorithm ***. Function:Generalized quartic GQ1

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	7	5	18	7	2	.4286101238782E-17	.4436575343520E-08
2000	7	5	19	7	3	.6657711876565E-14	.1712856995911E-06

```
 3000      7     4     19     7         5  .1330098353080E-12  .7430116274856E-06
 4000      7     5     19     7         7  .9336229776392E-19  .8433345139018E-09
 5000      7     5     19     7         8  .7882235749548E-16  .1842445472143E-07
 6000      7     5     19     7        10  .1487393638908E-12  .8586436958880E-06
 7000      8     5     22     8        14  .2406460586611E-20  .1385290217625E-09
 8000      7     6     18     5        13  .9575013586201E-13  .6369676492357E-06
 9000      8     6     21     7        17  .1119102164845E-19  .2896395431965E-09
10000      6     4     18     6        16  .1137760981808E-12  .8506597576465E-06
--------------------------------------------------------------------------------
TOTAL     71    50    192    68       .95 (seconds)    proc= 70.42%
```

66 *** CG Algorithm ***. Function:Diagonal 7

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

```
    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm2
--------------------------------------------------------------------------------
 1000      4     4     11     4         1 -.8168486188980E+03  .1537745059237E-10
 2000      4     4     11     4         1 -.1633697237796E+04  .3805228350097E-10
 3000      4     4     11     4         2 -.2450545856694E+04  .2174544839349E-10
 4000      4     4     11     4         3 -.3267394475592E+04  .3170984788818E-10
 5000      4     4     11     4         4 -.4084243094490E+04  .5520445084732E-10
 6000      4     4     11     4         5 -.4901091713388E+04  .7959929127498E-10
 7000      4     4     11     4         5 -.5717940332286E+04  .1519646412495E-10
 8000      4     4     11     4         6 -.6534788951185E+04  .5564848557919E-10
 9000      4     4     11     4         7 -.7351637570081E+04  .4427863170569E-10
10000      4     4     11     4         7 -.8168486188983E+04  .5622169396702E-10
--------------------------------------------------------------------------------
TOTAL     40    40    110    40       .41 (seconds)    proc= *****%
```

67 *** CG Algorithm ***. Function:Diagonal 8

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

```
    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm2
--------------------------------------------------------------------------------
 1000      3     3      7     3         1 -.4804530139182E+03  .3370130083545E-05
 2000      3     3      7     3         1 -.9609060278364E+03  .5713179367837E-05
 3000      3     3      7     3         3 -.1441359041755E+04  .7574472609205E-05
 4000      3     3      7     3         2 -.1921812055673E+04  .9166958385814E-05
 5000      3     3      7     3         3 -.2402265069591E+04  .1058162372755E-04
 6000      3     3      7     3         4 -.2882718083509E+04  .1186727784462E-04
 7000      3     3      7     3         5 -.3363171097427E+04  .1305418653092E-04
 8000      3     3      7     3         5 -.3843624111347E+04  .1416194653229E-04
 9000      3     3      7     3         6 -.4324077125263E+04  .1520453545772E-04
10000      3     3      7     3         7 -.4804530139182E+04  .1619224545557E-04
--------------------------------------------------------------------------------
TOTAL     30    30     70    30       .37 (seconds)    proc= *****%
```

68 *** CG Algorithm ***. Function:Full Hessian

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

```
    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm2
--------------------------------------------------------------------------------
 1000      3     3      7     3         0 -.2499999374896E+00  .2994740948696E-11
 2000      3     3      7     3         2 -.2499999843737E+00  .1911551298000E-11
 3000      3     3      7     3         1 -.2499999930552E+00  .1599287731400E-11
 4000      3     3      7     3         3 -.2499999960935E+00  .1193683379316E-12
 5000      3     3      7     3         3 -.2499999974998E+00  .1433494414778E-10
 6000      3     3      7     3         4 -.2499999982639E+00  .1900544875948E-11
 7000      3     3      7     3         5 -.2499999987244E+00  .1689631310715E-10
 8000      3     3      7     3         4 -.2499999990235E+00  .1456751041125E-10
 9000      3     3      7     3         5 -.2499999992284E+00  .1495615057614E-11
10000      3     3      7     3         6 -.2499999993751E+00  .3070876886113E-10
--------------------------------------------------------------------------------
TOTAL     30    30     70    30       .33 (seconds)    proc= *****%
```

69 *** CG Algorithm ***. Function:SINCOS

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

```
    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm2
--------------------------------------------------------------------------------
 1000      6     5     13     6         3  .3865995282465E+03  .1098462646851E-04
 2000      6     5     13     6         4  .7731990564929E+03  .1492791778973E-04
 3000      6     5     13     6         7  .1159798584739E+04  .1544301242271E-04
```

4000	7	5	15	7	11	.1546398112986E+04	.2218970719011E-06
5000	7	5	15	7	13	.1932997641232E+04	.2393650462321E-06
6000	7	5	15	7	15	.2319597169479E+04	.2822996711083E-06
7000	7	5	15	7	18	.2706196697725E+04	.2866687280573E-06
8000	7	5	15	7	21	.3092796225972E+04	.3909204277183E-06
9000	7	5	15	7	24	.3479395754218E+04	.4327304839443E-06
10000	7	5	15	7	26	.3865995282465E+04	.4395286013982E-06
TOTAL	67	50	144	67	1.42 (seconds)	proc= 74.63%	

70 *** CG Algorithm ***. Function:Generalized quartic GQ2

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	36	14	55	18	8	.1083284941995E-13	.3486316896428E-06
2000	33	9	58	24	15	.1429415256391E-12	.9906404909524E-06
3000	35	11	57	21	24	.8316601513885E-13	.1932269069964E-05
4000	33	8	59	25	31	.6147817772462E-13	.1389421783756E-05
5000	32	9	57	24	38	.1096373347719E-12	.1047152048695E-05
6000	29	7	50	20	41	.2723329179665E-12	.1201439111090E-05
7000	34	9	58	23	54	.3144572106176E-12	.1356316054782E-05
8000	32	7	57	24	62	.2303124994853E-12	.1737222488747E-05
9000	32	8	56	23	68	.2625352552924E-12	.1210367404095E-05
10000	28	6	52	23	68	.6308554485597E-12	.1943467984994E-05
TOTAL	324	88	559	225	4.09 (seconds)	proc= 27.16%	

71 *** CG Algorithm ***. Function:EXTROSNB (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	2001	550	3369	1310	538	.1687958596733E-04	.1076440854335E-03
2000	2001	564	3356	1272	1068	.1452390836216E-04	.6126169538091E-02
3000	2001	538	3397	1333	1632	.1377536571607E-04	.6121916395547E-03
4000	2001	572	3342	1277	2139	.1446307229500E-04	.8847753954465E-02
5000	2001	566	3339	1292	2698	.1702337867724E-04	.1407233795526E-03
6000	2001	578	3333	1270	3219	.1451829135826E-04	.1415724403759E-03
7000	2001	530	3368	1318	3767	.1529881214596E-04	.8111824133423E-04
8000	2001	544	3382	1317	4292	.1337793319591E-04	.1049948923061E-03
9000	2001	534	3319	1268	4774	.1695734587637E-04	.3120913623637E-02
10000	2001	533	3394	1334	5447	.1421273513949E-04	.3436529660055E-02
TOTAL	20010	5509	33599	12991	295.74 (seconds)	proc= 27.53%	

72 *** CG Algorithm ***. Function:ARGLINB (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	1	1	3	1	0	.2000000000000E+00	.2079456736898E-06
2000	1	1	3	1	0	.2000000000000E+00	.4995873990550E-05
3000	1	1	3	1	1	.2000000000000E+00	.2151999076694E-04
4000	2	2	5	2	1	.2000000000000E+00	.1127485028790E-04
5000	2	2	5	2	1	.2000000000000E+00	.2602098553826E-04
6000	2	2	5	2	1	.2000000000000E+00	.1072016765337E-04
7000	3	3	12	3	3	.2000000000000E+00	.1830956959264E-05
8000	8	8	146	8	14	.2000000000000E+00	.7756005038810E-05
9000	2	2	5	2	2	.2000000000000E+00	.3100779864090E-04
10000	2	2	5	2	3	.2000000000000E+00	.1430996671284E-04
TOTAL	24	24	192	24	.26 (seconds)	proc= *****%	

73 *** CG Algorithm ***. Function:FLETCHCR (CUTE)

theta spectral. betatype = 41 (Scaled Perry - Birgin & Martinez). stoptest= 1

n	iter	irs	fgcnt	lscnt	time(c)	fxnew	gnorm2
1000	25	6	49	21	3	.5363482144741E-15	.1187870707497E-05
2000	71	45	920	56	69	.4964243546265E+02	.1296750686781E-05
3000	78	53	1114	60	134	.4964243546265E+02	.8416642689330E-06
4000	67	41	675	47	102	.4964243546265E+02	.7317749694207E-06

```
 5000     28     7     58    25        21  .1981648795817E-15  .7764325833574E-06
 6000     81    55   1025    54       135  .4964243546265E+02  .3015606084166E-05
 7000     24     6     49    22        25  .7025083057005E-15  .1497990978487E-05
 8000     24     4     51    24        30  .1768326382949E-15  .7316651881601E-06
 9000     93    63   1356    69       479  .4964243546265E+02  .9877556784147E-06
10000     57    24    269    41       134  .4964243546265E+02  .1379945243169E-05
-----------------------------------------------------------------------------------
TOTAL    548   304   5566   419     11.32 (seconds)    proc= 55.47%
```

```
 74  *** CG Algorithm ***. Function:Extended Himmelblau  HIMMELBG (CUTE)

theta spectral.  betatype = 41  (Scaled Perry  -  Birgin & Martinez).  stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm2
-----------------------------------------------------------------------------------
 1000      8     8     10     1         1  .1367897922942E-03  .7838706974472E-05
 2000      8     8     10     1         3  .2882598693807E-03  .1167719297620E-04
 3000      8     8     10     1         4  .4424038228947E-03  .1463100228739E-04
 4000      8     8     10     1         6  .5979322564865E-03  .1712403393044E-04
 5000      8     8     10     1         7  .7543441883008E-03  .1932177541811E-04
 6000      8     8     10     1         8  .9113891195307E-03  .2130957360966E-04
 7000      8     8     10     1        10  .1068903144054E-02  .2313787787611E-04
 8000      8     8     10     1        11  .1226798508385E-02  .2484005064974E-04
 9000      8     8     10     1        13  .1385002482878E-02  .2643901585664E-04
10000      8     8     10     1        13  .1543451298993E-02  .2795129731911E-04
-----------------------------------------------------------------------------------
TOTAL     80    80    100    10       .76 (seconds)    proc= *****%
```

```
 75  *** CG Algorithm ***. Function:Extended Himmelblau  HIMMELBH (CUTE)

theta spectral.  betatype = 41  (Scaled Perry  -  Birgin & Martinez).  stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm2
-----------------------------------------------------------------------------------
 1000      6     3     13     6         2 -.5000000000000E+03  .5611435197837E-08
 2000      6     3     13     6         2 -.1000000000000E+04  .8041608885460E-08
 3000      6     3     13     6         3 -.1500000000000E+04  .1009183058819E-07
 4000      6     3     13     6         4 -.2000000000000E+04  .1125690781096E-07
 5000      6     3     13     6         5 -.2500000000000E+04  .2846979030434E-07
 6000      6     3     13     6         6 -.3000000000000E+04  .6158934480422E-07
 7000      6     3     13     6         8 -.3500000000000E+04  .8284570685214E-07
 8000      6     3     13     6         8 -.4000000000000E+04  .8939000256599E-07
 9000      6     3     13     6         9 -.4500000000000E+04  .1480271617952E-06
10000      6     3     13     6        11 -.5000000000000E+04  .6239527250480E-07
-----------------------------------------------------------------------------------
TOTAL     60    30    130    60       .58 (seconds)    proc= 50.00%

 ******************************
 CG - Conjugate Gradient package
 theta spectral
 betatype = 41 (Birgin & Martinez)
 stoptest =  1
 ******************************
```

May 2, 2006