Pressure Distribution Problem

25 Conjugate Gradient Algorithms
Comparison between conjugate gradient algorithms and their accelerated variants

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1. Conjugate Gradient Algorithms

```
   *-----------------------------------------------------
   | Fastest Conjugate Gradient Algorithm Project
   |                                      April 1, 2009
   | stoptest =     1
   | maxiter  = 10000
   | Conjugate Gradient with Powell restart.
   *-----------------------------------------------------

     1    CG-HS Algorithm. Function:Pressure Distribution Problem
          Hestenes and Stiefel.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000   1092   308   1717   624      2177 -.2828927135341E+00  .3094556267870E-04
-------------------------------------------------------------------------------
TOTAL    1092   308   1717   624     21.77 (seconds)    proc=  28.21%


     2    CG-FR Algorithm. Function:Pressure Distribution Problem
          Fletcher and Reeves.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000   1137   339   1792   654      2221 -.2828929493795E+00  .2289865251513E-04
-------------------------------------------------------------------------------
TOTAL    1137   339   1792   654     22.21 (seconds)    proc=  29.82%


     3    CG-PRP Algorithm. Function:Pressure Distribution Problem
          Polak-Ribiere and Polyak.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000    881   275   1410   528      1738 -.2828927675034E+00  .3353412105454E-04
-------------------------------------------------------------------------------
TOTAL     881   275   1410   528     17.38 (seconds)    proc=  31.21%


     4    CG-PRP+ Algorithm. Function:Pressure Distribution Problem
          Polak-Ribiere and Polyak plus.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000    881   275   1410   528      1729 -.2828927675034E+00  .3353412105454E-04
-------------------------------------------------------------------------------
TOTAL     881   275   1410   528     17.29 (seconds)    proc=  31.21%
```

```
     5    CG-CD Algorithm. Function:Pressure Distribution Problem
          Conjugate Descent - Fletcher. stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000   1272   376   2031   758      2485 -.2828926551976E+00  .3122189548122E-04
-------------------------------------------------------------------------------
TOTAL    1272   376   2031   758     24.85 (seconds)    proc=  29.56%


     6    CG-LS Algorithm. Function:Pressure Distribution Problem
          Liu and Storey.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000   1022   310   1617   594      1991 -.2828924337707E+00  .4631531989285E-04
-------------------------------------------------------------------------------
TOTAL    1022   310   1617   594     19.91 (seconds)    proc=  30.33%


     7    CG-DY Algorithm. Function:Pressure Distribution Problem
          Dai and Yuan.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000    880   232   1383   502      1694 -.2828927621973E+00  .3710896825946E-04
-------------------------------------------------------------------------------
TOTAL     880   232   1383   502     16.94 (seconds)    proc=  26.36%


     8    CG-DL Algorithm. Function:Pressure Distribution Problem
          Dai and Liao (t=1).  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000   1051   296   1642   590      2027 -.2828925290751E+00  .3677239976280E-04
-------------------------------------------------------------------------------
TOTAL    1051   296   1642   590     20.27 (seconds)    proc=  28.16%


     9    CG-DL+ Algorithm. Function:Pressure Distribution Problem
          Dai and Liao plus (t=1).  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000    854   236   1346   491      1654 -.2828928619864E+00  .2362264546372E-04
-------------------------------------------------------------------------------
TOTAL     854   236   1346   491     16.54 (seconds)    proc=  27.63%


    10    CG-SDC Algorithm. Function:Pressure Distribution Problem
          Andrei - Sufficient Descent Condition.  stoptest= 1
    aCGSD: beta = gtg/yts - ytg*stg/(yts*yts)
     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000  10001  9992  10009     8     10792  .1269510947732E+02  .1842346800380E+01
-------------------------------------------------------------------------------
TOTAL   10001  9992  10009     8    107.92 (seconds)    proc=  99.91%


    11    CG-hDY Algorithm. Function:Pressure Distribution Problem
          hDY:Hybrid Dai and Yuan. max(c*DY,min(HS,DY)). stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000   1232   355   1940   707      2409 -.2828928692524E+00  .2865598941648E-04
-------------------------------------------------------------------------------
TOTAL    1232   355   1940   707     24.09 (seconds)    proc=  28.81%


    12    CG-hDYz Algorithm. Function:Pressure Distribution Problem
          hDYz: Hybrid Dai and Yuan zero. max(0,min(HS,DY)). stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
```

```
 40000   1232   355   1940   707      2408 -.2828928692524E+00  .2865598941648E-04
-------------------------------------------------------------------------------------
TOTAL    1232   355   1940   707     24.08 (seconds)    proc=  28.81%


    13    CG-GN Algorithm. Function:Pressure Distribution Problem
          Gilbert and Nocedal.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000    823   234   1310   486      1599 -.2828928199235E+00  .2805383021583E-04
-------------------------------------------------------------------------------------
TOTAL     823   234   1310   486     15.99 (seconds)    proc=  28.43%


    14    CG-HuS Algorithm. Function:Pressure Distribution Problem
          PRP-FR: Hu and Storey. max(0,min(PRP,FR)). stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000    823   234   1310   486      1602 -.2828928199235E+00  .2805383021583E-04
-------------------------------------------------------------------------------------
TOTAL     823   234   1310   486     16.02 (seconds)    proc=  28.43%


    15    CG-TAS Algorithm. Function:Pressure Distribution Problem
          Touat-Ahmed and Storey. (PRP <= FR). stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000    823   234   1310   486      1600 -.2828928199235E+00  .2805383021583E-04
-------------------------------------------------------------------------------------
TOTAL     823   234   1310   486     16.00 (seconds)    proc=  28.43%


    16    LS-CD Algorithm. Function:Pressure Distribution Problem
          Hybrid Liu&Storey-Conjugate Descent. max(0,min(LS,CD)) stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000    918   274   1459   540      1791 -.2828922215603E+00  .5257096171368E-04
-------------------------------------------------------------------------------------
TOTAL     918   274   1459   540     17.91 (seconds)    proc=  29.85%


    17    CG-BM Algorithm. Function:Pressure Distribution Problem
          Birgin and Martinez (scaled Perry). Theta spectral. stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000   1109   300   1754   644      2179 -.2828928096628E+00  .2432824766449E-04
-------------------------------------------------------------------------------------
TOTAL    1109   300   1754   644     21.79 (seconds)    proc=  27.05%


    18    CG-BM+ Algorithm. Function:Pressure Distribution Problem
          Birgin and Martinez plus (scaled Perry). Theta spectral. stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000    821   229   1288   466      1586 -.2828927939461E+00  .3216140948582E-04
-------------------------------------------------------------------------------------
TOTAL     821   229   1288   466     15.86 (seconds)    proc=  27.89%


    19    CG-sPRP Algorithm. Function:Pressure Distribution Problem
          Scaled Polak-Ribiere and Polyak. Theta spectral. stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000    802   236   1292   489      1582 -.2828928385060E+00  .2466694383593E-04
-------------------------------------------------------------------------------------
TOTAL     802   236   1292   489     15.82 (seconds)    proc=  29.43%


    20    CG-sFR Algorithm. Function:Pressure Distribution Problem
          Scaled Fletcher and Revees. Theta spectral. stoptest= 1
```

```
     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000    846   248   1334   487      1637 -.2828928021693E+00  .2980700549320E-04
--------------------------------------------------------------------------------
TOTAL     846   248   1334   487     16.37 (seconds)    proc=  29.31%


    21    New CG Algorithm. Function:Pressure Distribution Problem
          Andrei New Sufficient Descent from PRP. stoptest= 1
    PRP-SDC: beta = (ytg-yty*stg/gtgprev)/yts
     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000   1206   386   1956   748      2426 -.2828929492914E+00  .7433452643742E-05
--------------------------------------------------------------------------------
TOTAL    1206   386   1956   748     24.26 (seconds)    proc=  32.01%


    22    New CG Algorithm. Function:Pressure Distribution Problem
          Andrei New Sufficient Descent from DY. stoptest= 1
          ACGSD: beta=ytg/yts-ytg*stg/(yts**2)

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000   1063   283   1685   621      2082 -.2828927318698E+00  .3190897658234E-04
--------------------------------------------------------------------------------
TOTAL    1063   283   1685   621     20.82 (seconds)    proc=  26.62%


    23    New CG Algorithm. Function:Pressure Distribution Problem
          Andrei Sufficient Descent from DY (max). stoptest= 1
          ACGSDz: beta=max(0,ytg/yts)*(1-stg/yts)

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000   1055   294   1662   606      2054 -.2828928354122E+00  .3065409312930E-04
--------------------------------------------------------------------------------
TOTAL    1055   294   1662   606     20.54 (seconds)    proc=  27.87%


    24    New CG Algorithm. Function:Pressure Distribution Problem
          PRP - DY with Newton direction. (NDOMB) stoptest= 1
     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000   1035   281   1619   583      2002 -.2828929493123E+00  .1164462556719E-04
--------------------------------------------------------------------------------
TOTAL    1035   281   1619   583     20.02 (seconds)    proc=  27.15%


    25    New CG Algorithm. Function:Pressure Distribution Problem
          PRP - DY with Conjugacy Condition. (CCOMB) stoptest= 1
     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000    968   271   1520   551      1876 -.2828929338199E+00  .4271620184242E-04
--------------------------------------------------------------------------------
TOTAL     968   271   1520   551     18.76 (seconds)    proc=  28.00%
```

2. Accelerated Conjugate Gradient Algorithms

```
*-----------------------------------------------------
| Fastest Conjugate Gradient Algorithm Project
|                                        April 1, 2009
| stoptest =     1
| maxiter  = 10000
| Accelerated Conjugate Gradient with Powell restart.
*-----------------------------------------------------

  1    CG-HS Algorithm. Function:Pressure Distribution Problem
       Hestenes and Stiefel.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000    634     0   1303    34      1595 -.2828929487185E+00  .2267804724615E-04
-------------------------------------------------------------------------------
TOTAL     634     0   1303    34     15.95 (seconds)    proc=    .00%


  2    CG-FR Algorithm. Function:Pressure Distribution Problem
       Fletcher and Reeves.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000    631     0   1297    34      1543 -.2828929485411E+00  .2457336785793E-04
-------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.43 (seconds)    proc=    .00%


  3    CG-PRP Algorithm. Function:Pressure Distribution Problem
       Polak-Ribiere and Polyak.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000    631     0   1297    34      1559 -.2828929485421E+00  .2454677340183E-04
-------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.59 (seconds)    proc=    .00%


  4    CG-PRP+ Algorithm. Function:Pressure Distribution Problem
       Polak-Ribiere and Polyak plus.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000    631     0   1297    34      1555 -.2828929485421E+00  .2454677340183E-04
-------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.55 (seconds)    proc=    .00%


  5    CG-CD Algorithm. Function:Pressure Distribution Problem
       Conjugate Descent - Fletcher. stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000    631     0   1297    34      1543 -.2828929485416E+00  .2455850712383E-04
-------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.43 (seconds)    proc=    .00%


  6    CG-LS Algorithm. Function:Pressure Distribution Problem
       Liu and Storey.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000    631     0   1297    34      1553 -.2828929485424E+00  .2453431572966E-04
-------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.53 (seconds)    proc=    .00%


  7    CG-DY Algorithm. Function:Pressure Distribution Problem
       Dai and Yuan.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
```

```
 40000    631     0   1297    34      1556 -.2828929485425E+00  .2452443036839E-04
-------------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.56 (seconds)    proc=    .00%


     8    CG-DL Algorithm. Function:Pressure Distribution Problem
          Dai and Liao (t=1).  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000    631     0   1297    34      1559 -.2828929485420E+00  .2454429030950E-04
-------------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.59 (seconds)    proc=    .00%


     9    CG-DL+ Algorithm. Function:Pressure Distribution Problem
          Dai and Liao plus (t=1).  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000    631     0   1297    34      1562 -.2828929485434E+00  .2450352142472E-04
-------------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.62 (seconds)    proc=    .00%


    10    CG-SDC Algorithm. Function:Pressure Distribution Problem
          Andrei - Sufficient Descent Condition.  stoptest= 1
    aCGSD: beta = gtg/yts - ytg*stg/(yts*yts)
     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000    631     0   1297    34      1563 -.2828929485445E+00  .2448290684214E-04
-------------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.63 (seconds)    proc=    .00%


    11    CG-hDY Algorithm. Function:Pressure Distribution Problem
          hDY:Hybrid Dai and Yuan. max(c*DY,min(HS,DY)). stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000   1058   188   2682   565      3235 -.2828927256667E+00  .4062853423683E-04
-------------------------------------------------------------------------------------
TOTAL    1058   188   2682   565     32.35 (seconds)    proc=  17.77%


    12    CG-hDYz Algorithm. Function:Pressure Distribution Problem
          hDYz: Hybrid Dai and Yuan zero. max(0,min(HS,DY)). stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000   1058   188   2682   565      3238 -.2828927256667E+00  .4062853423683E-04
-------------------------------------------------------------------------------------
TOTAL    1058   188   2682   565     32.38 (seconds)    proc=  17.77%


    13    CG-GN Algorithm. Function:Pressure Distribution Problem
          Gilbert and Nocedal.  stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000    631     0   1297    34      1552 -.2828929485422E+00  .2454290905047E-04
-------------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.52 (seconds)    proc=    .00%


    14    CG-HuS Algorithm. Function:Pressure Distribution Problem
          PRP-FR: Hu and Storey. max(0,min(PRP,FR)). stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------------
 40000    631     0   1297    34      1554 -.2828929485422E+00  .2454290905047E-04
-------------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.54 (seconds)    proc=    .00%


    15    CG-TAS Algorithm. Function:Pressure Distribution Problem
          Touat-Ahmed and Storey. (PRP <= FR). stoptest= 1
```

```
     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000    631     0   1297    34      1553 -.2828929485422E+00  .2454290905047E-04
--------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.53 (seconds)    proc=    .00%


    16    LS-CD Algorithm. Function:Pressure Distribution Problem
          Hybrid Liu&Storey-Conjugate Descent. max(0,min(LS,CD)) stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000    631     0   1297    34      1554 -.2828929485425E+00  .2453418661740E-04
--------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.54 (seconds)    proc=    .00%


    17    CG-BM Algorithm. Function:Pressure Distribution Problem
          Birgin and Martinez (scaled Perry). Theta spectral. stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000    631     0   1297    34      1565 -.2828929485433E+00  .2450378986066E-04
--------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.65 (seconds)    proc=    .00%


    18    CG-BM+ Algorithm. Function:Pressure Distribution Problem
          Birgin and Martinez plus (scaled Perry). Theta spectral. stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000    631     0   1297    34      1567 -.2828929485436E+00  .2449702546283E-04
--------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.67 (seconds)    proc=    .00%


    19    CG-sPRP Algorithm. Function:Pressure Distribution Problem
          Scaled Polak-Ribiere and Polyak. Theta spectral. stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000   1059   205   2688   569      3246 -.2828928849703E+00  .2006996590907E-04
--------------------------------------------------------------------------------
TOTAL    1059   205   2688   569     32.46 (seconds)    proc=  19.36%


    20    CG-sFR Algorithm. Function:Pressure Distribution Problem
          Scaled Fletcher and Revees. Theta spectral. stoptest= 1

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000    845   176   2117   426      2536 -.2828929012097E+00  .3449419575132E-04
--------------------------------------------------------------------------------
TOTAL     845   176   2117   426     25.36 (seconds)    proc=  20.83%


    21    New CG Algorithm. Function:Pressure Distribution Problem
          Andrei New Sufficient Descent from PRP. stoptest= 1
    PRP-SDC: beta = (ytg-yty*stg/gtgprev)/yts
     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000    979   142   2591   631      3115 -.2828928394355E+00  .2949356181982E-04
--------------------------------------------------------------------------------
TOTAL     979   142   2591   631     31.15 (seconds)    proc=  14.50%


    22    New CG Algorithm. Function:Pressure Distribution Problem
          Andrei New Sufficient Descent from DY. stoptest= 1
          ACGSD: beta=ytg/yts-ytg*stg/(yts**2)

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
--------------------------------------------------------------------------------
 40000    631     0   1297    34      1562 -.2828929485441E+00  .2448880474119E-04
--------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.62 (seconds)    proc=    .00%
```

```
    23    New CG Algorithm. Function:Pressure Distribution Problem
          Andrei Sufficient Descent from DY (max). stoptest= 1
          ACGSDz: beta=max(0,ytg/yts)*(1-stg/yts)

     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000    631     0   1297    34      1561 -.2828929485432E+00  .2450919878429E-04
-------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.61 (seconds)    proc=    .00%


    24    New CG Algorithm. Function:Pressure Distribution Problem
          PRP - DY with Newton direction. (NDOMB) stoptest= 1
     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000    631     0   1297    34      1560 -.2828929485422E+00  .2453919907835E-04
-------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.60 (seconds)    proc=    .00%


    25    New CG Algorithm. Function:Pressure Distribution Problem
          PRP - DY with Conjugacy Condition. (CCOMB) stoptest= 1
     n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
 40000    631     0   1297    34      1561 -.2828929485425E+00  .2452443140802E-04
-------------------------------------------------------------------------------
TOTAL     631     0   1297    34     15.61 (seconds)    proc=    .00%
```

Remarks.

This problem belongs to the MINPACK2 collection.

These results have been obtained with APPL2.FOR package which implements 25 conjugate gradient algorithms in classical and accelerated versions. To use the accelerated version of these algorithms the value of the logical parameter accel must be set to .true.

Observe the differences between cpu time corresponding to the conjugate gradient algorithms and their accelerated versions.

References

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