Performance of DLDC conjugate gradient algorithm on MINPACK2 Applications

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Elastic-Plastic Torsion

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   ****************************************************
   * DLDC                              Neculai Andrei **
   * Accelerated Dai - Liao Conjugate Gradient with **
   * Guaranteed Descent and Conjugacy conditions.   **
   * ---------------------------------------------- **
   * Project: FCGA                                  **
   * The fastest conjugate gradient algorithm       **
   ****************************************************

   Parameters: descent=  .1000000000000E-01    conjugacy=  .5000000000000E-01

   Dai-Liao DC. Powell restart.     July 16, 2009
-------------------------------------------------------------------------------

     1    DLDC Algorithm. Function:    Elastic-Plastic Torsion Problem
          stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
  40000    241     0    510    27       600 -.4392678188056E+00  .3175761330765E-04
-------------------------------------------------------------------------------
  TOTAL    241     0    510    27      6.00 (seconds)    proc=    .00%
```

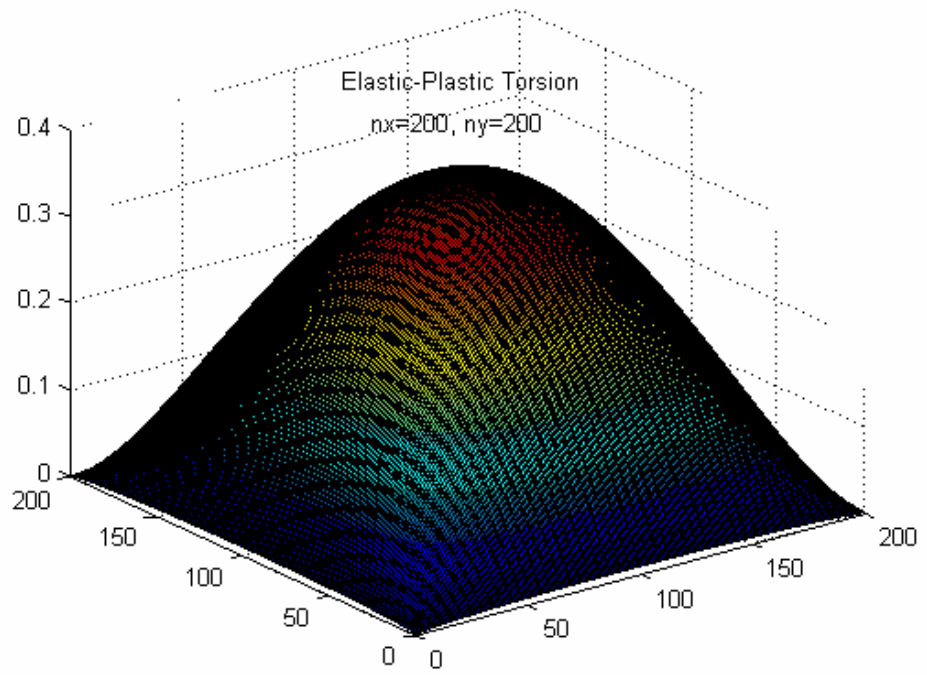

Fig. 1. Elastic-Plastic torsion Problem. 40,000 variables.

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   ***************************************************
   * DLDC                              Neculai Andrei **
   * Accelerated Dai - Liao Conjugate Gradient with **
   * Guaranteed Descent and Conjugacy conditions.   **
   * ---------------------------------------------- **
   * Project: FCGA                                  **
   * The fastest conjugate gradient algorithm       **
   ***************************************************

   Parameters: descent=  .1000000000000E-01    conjugacy=  .5000000000000E-01

   Dai-Liao DC. Powell restart.     July 16, 2009
-------------------------------------------------------------------------------

     1    DLDC Algorithm. Function:    Elastic-Plastic Torsion Problem
          stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
1000000   1113     0   2257    30     80183 -.4393016862076E+00  .6317165463008E-04
-------------------------------------------------------------------------------
  TOTAL   1113     0   2257    30    801.83 (seconds)    proc=    .00%
```

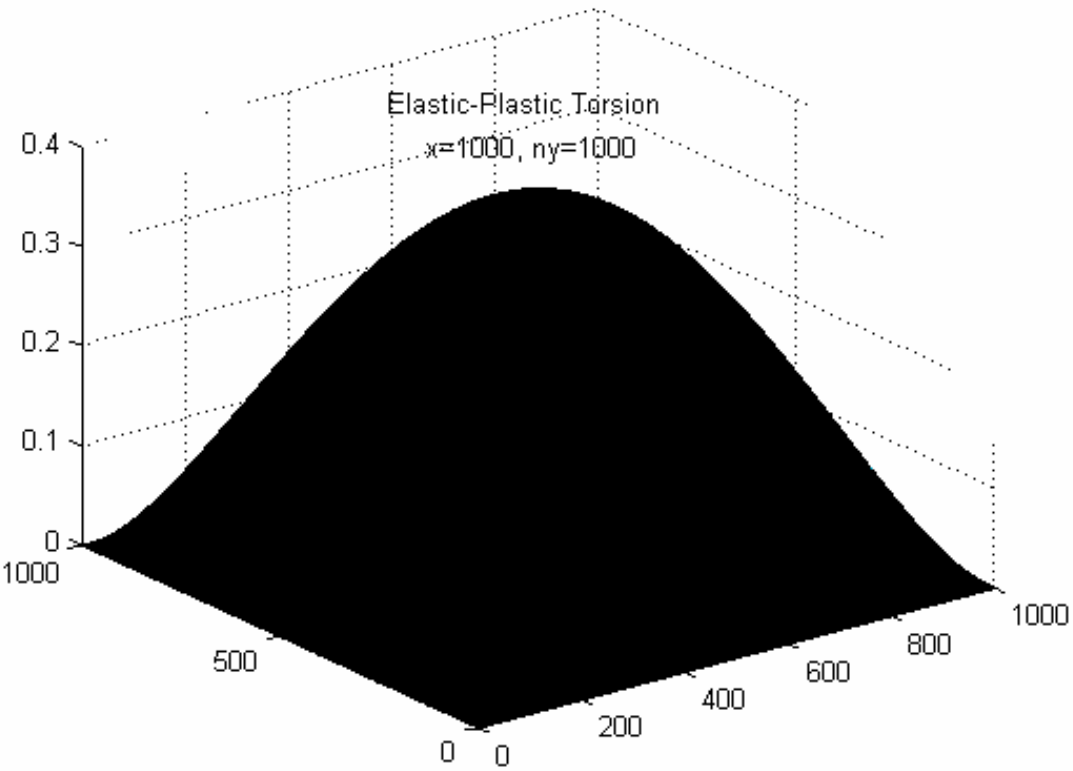

Fig. 2. Elastic-Plastic Torsion. 1,000,000 variables.

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   ****************************************************
   * DLDC                              Neculai Andrei **
   * Accelerated Dai - Liao Conjugate Gradient with **
   * Guaranteed Descent and Conjugacy conditions.   **
   * ---------------------------------------------- **
   * Project: FCGA                                  **
   * The fastest conjugate gradient algorithm       **
   ****************************************************

   Parameters: descent=  .1000000000000E-01    conjugacy=  .5000000000000E-01

   Dai-Liao DC. Powell restart.     July 14, 2009
-------------------------------------------------------------------------------

     1    DLDC Algorithm. Function:    Elastic-Plastic Torsion Problem
          stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
4000000   1000     0   2011    10    270863 -.4392354528860E+00  .1174375824136E-03
-------------------------------------------------------------------------------
  TOTAL   1000     0   2011    10   2708.63 (seconds)    proc=    .00%
```

Pressure Distribution inn a Journal Bearing

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   ****************************************************
   * DLDC                              Neculai Andrei **
   * Accelerated Dai - Liao Conjugate Gradient with **
   * Guaranteed Descent and Conjugacy conditions.   **
   * ---------------------------------------------- **
   * Project: FCGA                                  **
   * The fastest conjugate gradient algorithm       **
   ****************************************************

   Parameters: descent=  .1000000000000E-01    conjugacy=  .5000000000000E-01

   Dai-Liao DC. Powell restart.     July 16, 2009
-------------------------------------------------------------------------------

     1    DLDC Algorithm. Function:Pressure Distribution in a Journal Bearing
          stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
  40000    631     0   1297    34      1552 -.2828929485449E+00  .2449547850380E-04
-------------------------------------------------------------------------------
TOTAL    631     0   1297    34     15.52 (seconds)    proc=    .00%
```

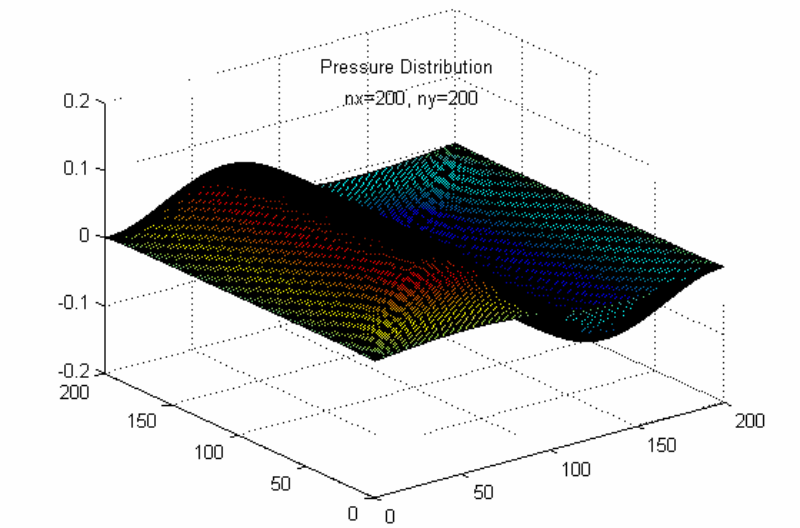

Fig. 3. Pressure Distribution in a Journal Bearing. 40,000 variables.

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   ****************************************************
   * DLDC                              Neculai Andrei **
   * Accelerated Dai - Liao Conjugate Gradient with **
   * Guaranteed Descent and Conjugacy conditions.   **
   * ---------------------------------------------- **
   * Project: FCGA                                  **
   * The fastest conjugate gradient algorithm       **
   ****************************************************

   Parameters: descent=  .1000000000000E-01    conjugacy=  .5000000000000E-01

   Dai-Liao DC. Powell restart.     July 16, 2009
-------------------------------------------------------------------------------

     1    DLDC Algorithm. Function:Pressure Distribution in a Journal Bearing
          stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
1000000   2846     0   5720    27    207680 -.2829101207656E+00  .7887058606115E-04
-------------------------------------------------------------------------------
  TOTAL   2846     0   5720    27   2076.80 (seconds)    proc=    .00%
```

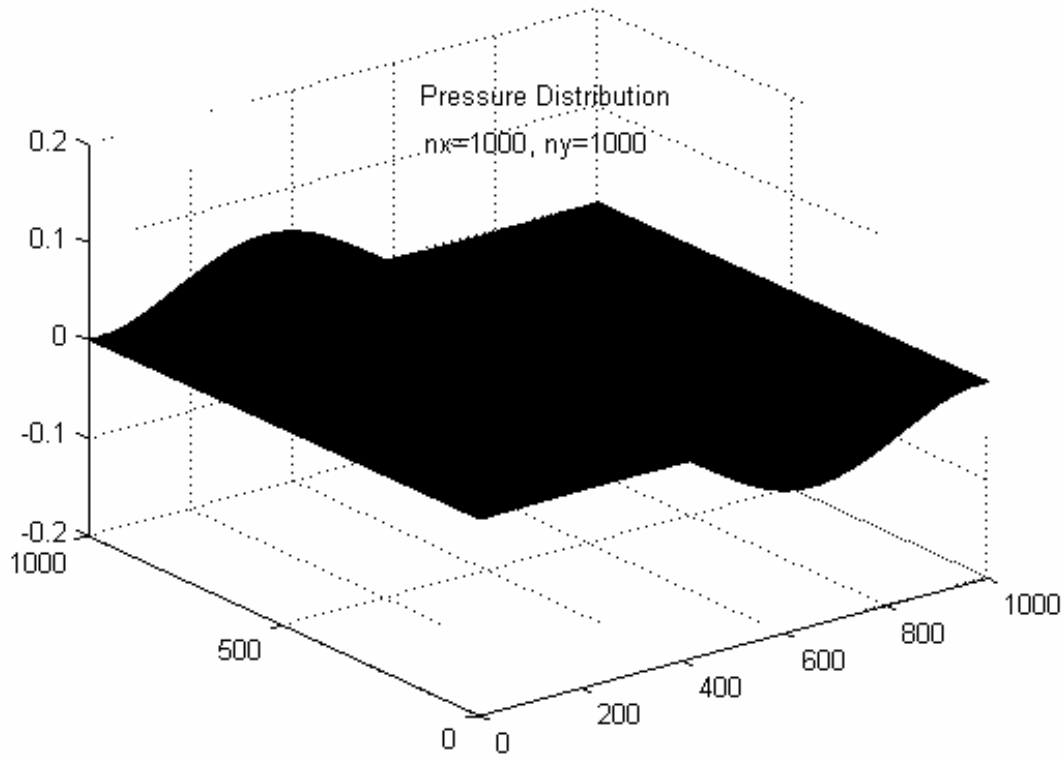

Fig. 4. Pressure Distribution in a Journal Bearing. 1,000,000 variables.

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   ***************************************************
   * DLDC                            Neculai Andrei **
   * Accelerated Dai - Liao Conjugate Gradient with **
   * Guaranteed Descent and Conjugacy conditions.   **
   * ---------------------------------------------- **
   * Project: FCGA                                  **
   * The fastest conjugate gradient algorithm       **
   ***************************************************

   Parameters: descent=  .1000000000000E-01    conjugacy=  .5000000000000E-01

   Dai-Liao DC. Powell restart.     July 15, 2009
-------------------------------------------------------------------------------

     1    DLDC Algorithm. Function:    Pressure Distribution in a Journal Bearing
          stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
4000000   5362     0  10752    27   1681936 -.2829104108987E+00  .1030580999263E-03
-------------------------------------------------------------------------------
  TOTAL   5362     0  10752    27   16819.36 (seconds)    proc=    .00%
```

Optimal Design with Compposite Materials

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   ***************************************************
   * DLDC                            Neculai Andrei **
   * Accelerated Dai - Liao Conjugate Gradient with **
   * Guaranteed Descent and Conjugacy conditions.   **
   * ---------------------------------------------- **
   * Project: FCGA                                  **
   * The fastest conjugate gradient algorithm       **
   ***************************************************

   Parameters: descent=  .1000000000000E-01    conjugacy=  .5000000000000E-01

   Dai-Liao DC. Powell restart.     July 16, 2009
-------------------------------------------------------------------------------

     1    DLDC Algorithm. Function:Optimal Design with Composite Materials
          stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
  40000   1036     0   2100    27      4363 -.1138128847501E-01  .3697377530473E-04
-------------------------------------------------------------------------------
  TOTAL   1036     0   2100    27     43.63 (seconds)    proc=    .00%
```

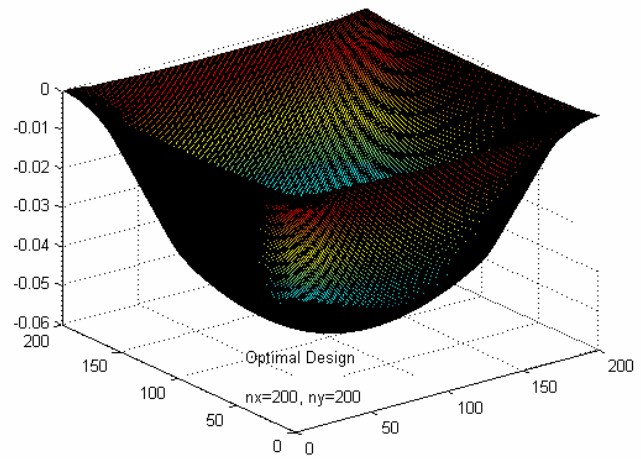

Fig. 5. Optimal Design with Composite Materials. 40,000 variables

```
   ****************************************************
   * DLDC                            Neculai Andrei **
   * Accelerated Dai - Liao Conjugate Gradient with **
   * Guaranteed Descent and Conjugacy conditions.   **
   * ---------------------------------------------- **
   * Project: FCGA                                  **
   * The fastest conjugate gradient algorithm       **
   ****************************************************

   Parameters: descent=  .1000000000000E-01    conjugacy=  .5000000000000E-01

   Dai-Liao DC. Powell restart.     July 16, 2009
-------------------------------------------------------------------------------

     1    DLDC Algorithm. Function: Optimal Design with Composite Materials
          stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
1000000   4695     0   9454    63    550531 -.1138215339461E-01  .1405771236101E-03
-------------------------------------------------------------------------------
  TOTAL   4695     0   9454    63   5505.31 (seconds)    proc=    .00%
```

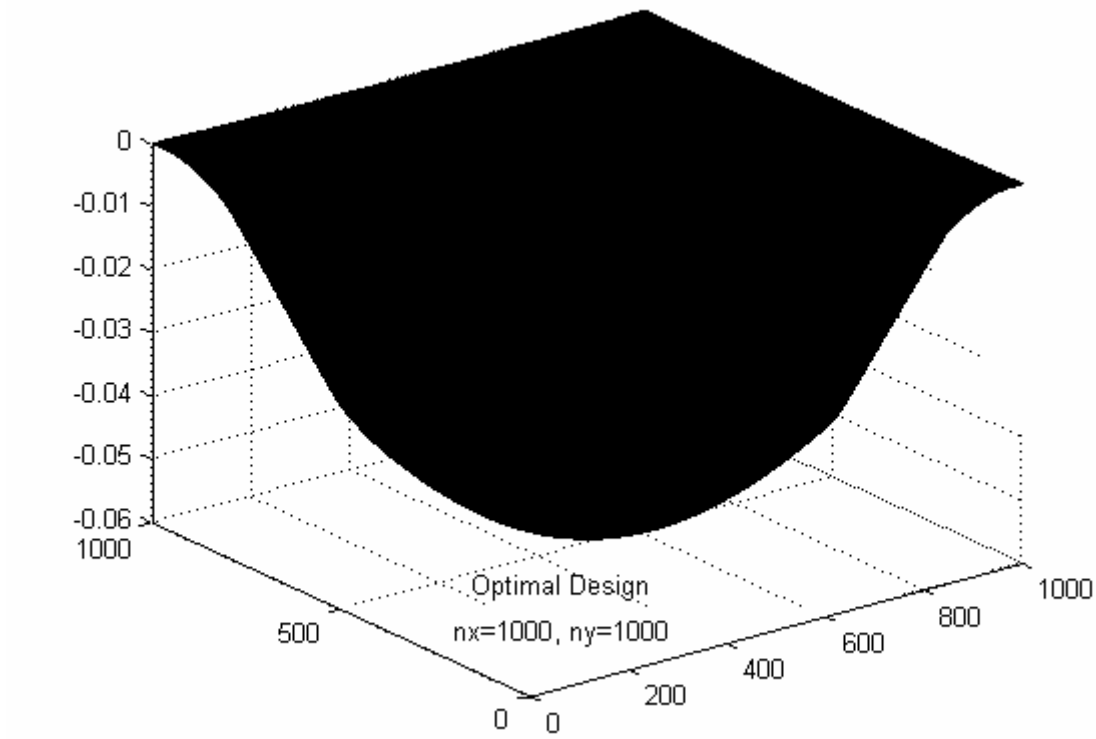

Fig. 6. Optimal Design with Composite Materials. 1,000,000 variables

Steady State Combustion

```
   ****************************************************
   * DLDC                                Neculai Andrei **
   * Accelerated Dai - Liao Conjugate Gradient with **
   * Guaranteed Descent and Conjugacy conditions.   **
   * ---------------------------------------------- **
   * Project: FCGA                                  **
   * The fastest conjugate gradient algorithm       **
   ****************************************************

   Parameters: descent=  .1000000000000E-01    conjugacy=  .5000000000000E-01

   Dai-Liao DC. Powell restart.     July 16, 2009
-------------------------------------------------------------------------------

     1    DLDC Algorithm. Function:    Steady State Combustion
          stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
  40000    299     0    632    33      1896 -.5611448493593E+01  .2374446248274E-04
-------------------------------------------------------------------------------
  TOTAL    299     0    632    33     18.96 (seconds)    proc=    .00%
```

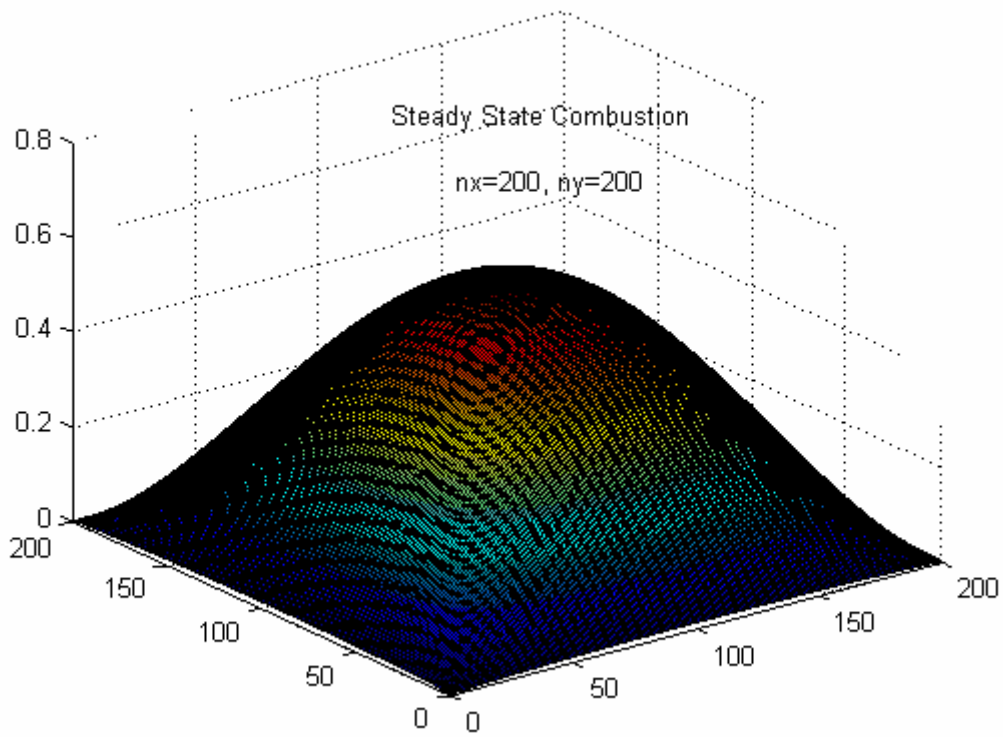

Fig. 7. Steady State Combustion. 40,000 variables.

```
   ****************************************************
   * DLDC                              Neculai Andrei **
   * Accelerated Dai - Liao Conjugate Gradient with **
   * Guaranteed Descent and Conjugacy conditions.   **
   * ---------------------------------------------- **
   * Project: FCGA                                  **
   * The fastest conjugate gradient algorithm       **
   ****************************************************

   Parameters: descent=  .1000000000000E-01    conjugacy=  .5000000000000E-01

   Dai-Liao DC. Powell restart.     July 16, 2009
-------------------------------------------------------------------------------

     1    DLDC Algorithm. Function:   Steady State Combustion
          stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
1000000   1413     0   2864    37    230210 -.5611488188409E+01  .4244604041539E-04
-------------------------------------------------------------------------------
  TOTAL   1413     0   2864    37   2302.10 (seconds)    proc=    .00%
```

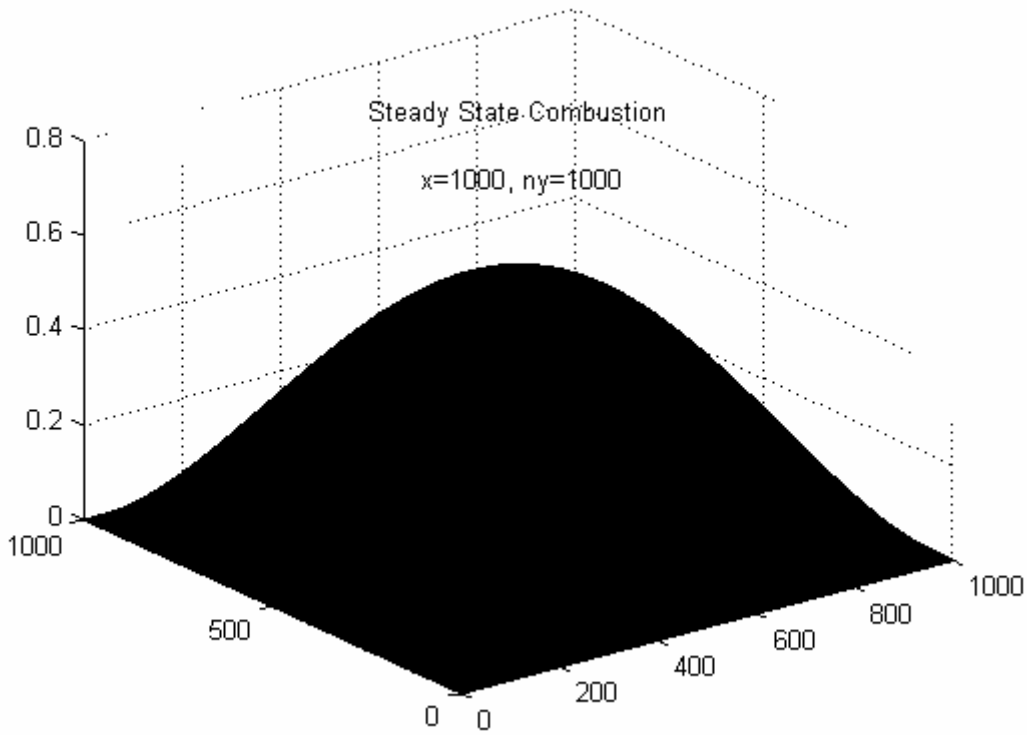

Fig. 8. Steady State Combustion. 1,000,000 variables.

```
   ***************************************************
   * DLDC                              Neculai Andrei **
   * Accelerated Dai - Liao Conjugate Gradient with **
   * Guaranteed Descent and Conjugacy conditions.   **
   * ---------------------------------------------- **
   * Project: FCGA                                  **
   * The fastest conjugate gradient algorithm       **
   ***************************************************

   Parameters: descent=  .1000000000000E-01    conjugacy=  .5000000000000E-01

   Dai-Liao DC. Powell restart.     July 17, 2009
-------------------------------------------------------------------------------

     1    DLDC Algorithm. Function:    Minimal Surface Area
          stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
  40000    282     1    591    26      1090  .1000000005266E+01  .3699531322735E-04
-------------------------------------------------------------------------------
  TOTAL    282     1    591    26     10.90 (seconds)    proc=    .35%
```

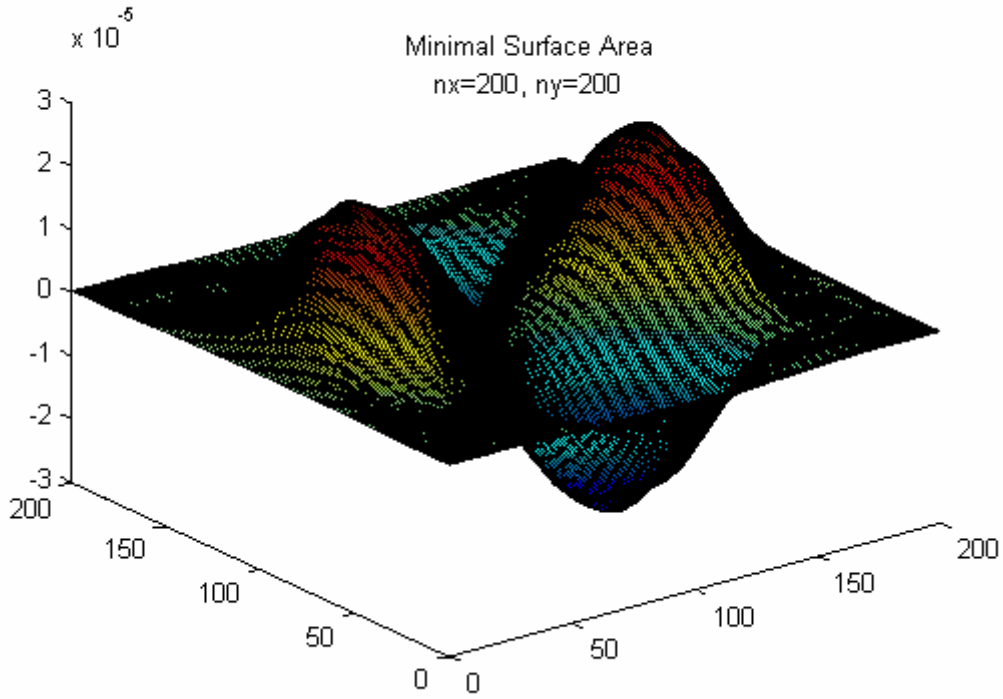

Fig. 9. Minimal Surface Area. 40,000 variables.

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*****************************************************
* DLDC                                Neculai Andrei **
* Accelerated Dai - Liao Conjugate Gradient with **
* Guaranteed Descent and Conjugacy conditions.   **
* ---------------------------------------------- **
* Project: FCGA                                  **
* The fastest conjugate gradient algorithm       **
*****************************************************

Parameters: descent=  .1000000000000E-01    conjugacy=  .5000000000000E-01

Dai-Liao DC. Powell restart.     July 17, 2009
-------------------------------------------------------------------------------

     1    DLDC Algorithm. Function:    Minimal Surface Area
          stoptest= 1

    n   iter   irs  fgcnt lscnt   time(c)        fxnew              gnorm
-------------------------------------------------------------------------------
1000000   1305     2   2640    29    140321  .1000000144291E+01  .1046550534031E-03
-------------------------------------------------------------------------------
  TOTAL   1305     2   2640    29   1403.21 (seconds)    proc=    .15%
```

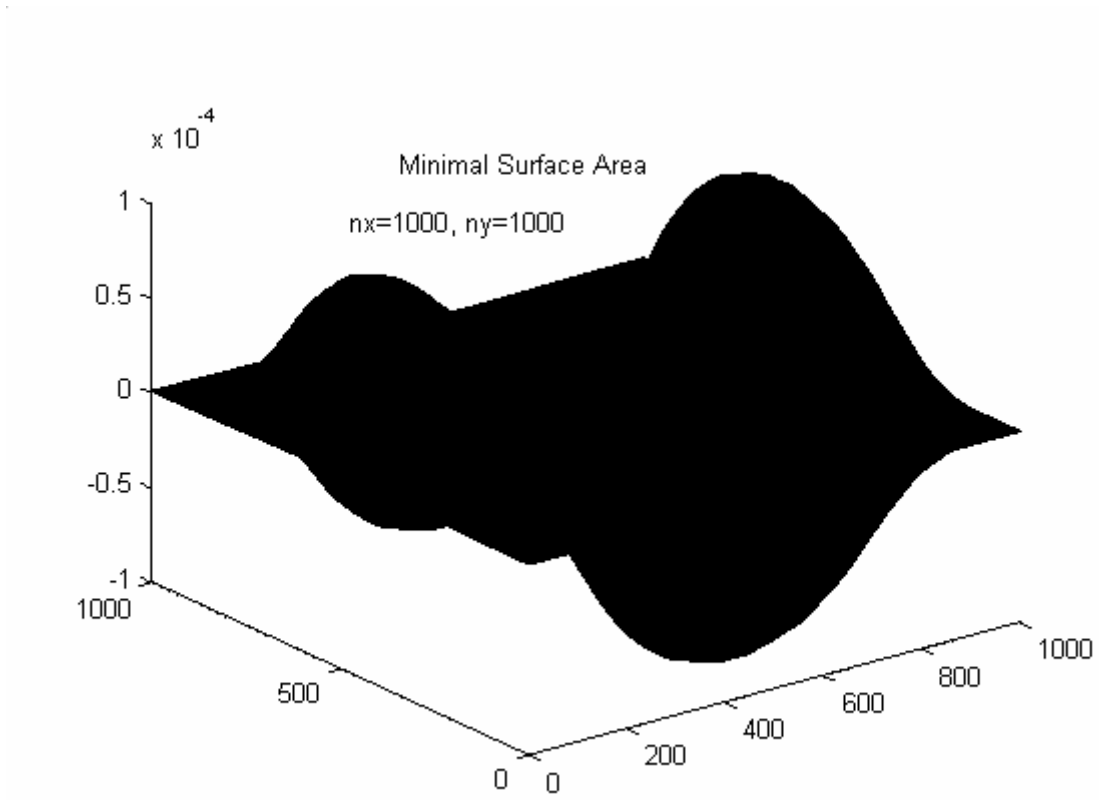

Fig. 10. Minimal Surface Area. 1,000,000 variables.

July 21, 2009