# SPG Program
# Broyden Tridiagonal

**Neculai Andrei**
*Research Institute for Informatics,*
*Center for Advanced Modeling and Optimization,*
*8-10, Averescu Avenue, Bucharest 1, Romania,*
*Academy of Romanian Scientists*
*E-mail: nandrei@ici.ro*

**August 17, 2010**

```
Project: Simple Bounded Optimization
====================================

SPG Program - E.G.Birgin, J.M.Martinez and M.Raydan.
====================================================

Date: ---  Month: 8  Day:17  Year: 2010

Termination criteria:
cginfn .le. eps
cgtwon .le. eps2**2
where :
cginfn is the gradient infinite-norm, and eps=  .0000000000000E+00
cgtwon is the gradient 2-norm, and eps2=  .1000000000000E-05

Line search interpolation:
Line search with safeguarded quadratic interpolation
==================================================================

Broyden Tridiagonal function:    n=   1000

F=        3.9706710349D-01
CGINFNORM=  5.6369135470D-07
CGTWONORM=  8.1397311957D-07
FLAG=      1

ITER=       135
FCNT=       214
GCNT=       136
TIME(csec.)=     0

Broyden Tridiagonal function:    n=   2000

F=        3.9706710349D-01
CGINFNORM=  1.8505523192D-07
CGTWONORM=  7.0927880908D-07
FLAG=      1

ITER=        99
FCNT=       110
GCNT=       100
TIME(csec.)=     6

Broyden Tridiagonal function:    n=   3000

F=        3.9706710349D-01
CGINFNORM=  6.4234473551D-07
CGTWONORM=  9.8504521892D-07
FLAG=      1

ITER=       114
FCNT=       122
GCNT=       115
TIME(csec.)=    11

Broyden Tridiagonal function:    n=   4000

F=        3.9706710349D-01
CGINFNORM=  6.0884015307D-07
CGTWONORM=  8.9929426375D-07
FLAG=      1

ITER=        91
FCNT=        98
GCNT=        92
TIME(csec.)=    11
```

```
Project: Simple Bounded Optimization
====================================

SPG Program - E.G.Birgin, J.M.Martinez and M.Raydan.
====================================================

Date: ---  Month: 8  Day:17  Year: 2010

Termination criteria:
cginfn .le. eps
cgtwon .le. eps2**2
where :
cginfn is the gradient infinite-norm, and eps=  .0000000000000E+00
cgtwon is the gradient 2-norm, and eps2=  .1000000000000E-05

Line search interpolation:
Line search with safeguarded cubic interpolation
==================================================================

Broyden Tridiagonal function:    n=   1000

F=        3.9706710349D-01
CGINFNORM=  4.7012012228D-07
CGTWONORM=  7.1396280974D-07
FLAG=      1

ITER=       129
FCNT=       161
GCNT=       130
TIME(csec.)=     0

Broyden Tridiagonal function:    n=   2000

F=        3.9706710349D-01
CGINFNORM=  1.3623686168D-07
CGTWONORM=  4.9564977386D-07
FLAG=      1

ITER=       102
FCNT=       114
GCNT=       103
TIME(csec.)=     5

Broyden Tridiagonal function:    n=   3000

F=        3.9706710349D-01
CGINFNORM=  6.0032128013D-07
CGTWONORM=  9.0933449586D-07
FLAG=      1

ITER=       111
FCNT=       116
GCNT=       112
TIME(csec.)=    11

Broyden Tridiagonal function:    n=   4000

F=        3.9706710349D-01
CGINFNORM=  5.0276571451D-07
CGTWONORM=  8.1056206321D-07
FLAG=      1

ITER=        88
FCNT=        96
GCNT=        89
TIME(csec.)=    11
```

```
  Broyden Tridiagonal function:    n=   5000

F=         3.9706710349D-01
CGINFNORM=  4.5070552135D-07
CGTWONORM=  7.6470070157D-07
FLAG=       1

ITER=         98
FCNT=        106
GCNT=         99
TIME(csec.)=     16
```

```
  Broyden Tridiagonal function:    n=   5000

F=         3.9706710349D-01
CGINFNORM=  1.4693988770D-07
CGTWONORM=  6.0887590007D-07
FLAG=       1

ITER=         77
FCNT=         84
GCNT=         78
TIME(csec.)=     11
```

```
  Broyden Tridiagonal function:    n=   6000

F=         3.9706710349D-01
CGINFNORM=  6.2298368320D-07
CGTWONORM=  9.5465868978D-07
FLAG=       1

ITER=         88
FCNT=         95
GCNT=         89
TIME(csec.)=     17
```

```
  Broyden Tridiagonal function:    n=   6000

F=         3.9706710349D-01
CGINFNORM=  2.2430759938D-07
CGTWONORM=  8.9279439898D-07
FLAG=       1

ITER=         76
FCNT=         82
GCNT=         77
TIME(csec.)=     17
```

```
  Broyden Tridiagonal function:    n=   7000

F=         3.9706710349D-01
CGINFNORM=  2.4590264125D-07
CGTWONORM=  6.5175489163D-07
FLAG=       1

ITER=        123
FCNT=        136
GCNT=        124
TIME(csec.)=     33
```

```
  Broyden Tridiagonal function:    n=   7000

F=         3.9706710349D-01
CGINFNORM=  4.9249232115D-07
CGTWONORM=  6.7068295140D-07
FLAG=       1

ITER=         96
FCNT=        104
GCNT=         97
TIME(csec.)=     22
```

```
  Broyden Tridiagonal function:    n=   8000

F=         6.6148652798D-01
CGINFNORM=  2.9133456669D-07
CGTWONORM=  5.3156674300D-07
FLAG=       1

ITER=         88
FCNT=         97
GCNT=         89
TIME(csec.)=     27
```

```
  Broyden Tridiagonal function:    n=   8000

F=         6.6148652798D-01
CGINFNORM=  1.0337874989D-07
CGTWONORM=  2.9972113607D-07
FLAG=       1

ITER=        103
FCNT=        110
GCNT=        104
TIME(csec.)=     33
```

```
  Broyden Tridiagonal function:    n=   9000

F=         6.6148652798D-01
CGINFNORM=  4.6291840261D-07
CGTWONORM=  8.7514983703D-07
FLAG=       1

ITER=        101
FCNT=        111
GCNT=        102
TIME(csec.)=     33
```

```
  Broyden Tridiagonal function:    n=   9000

F=         6.6148652798D-01
CGINFNORM=  4.3882718526D-07
CGTWONORM=  8.9536276605D-07
FLAG=       1

ITER=         90
FCNT=         97
GCNT=         91
TIME(csec.)=     33
```

```
  Broyden Tridiagonal function:    n=  10000

F=         6.6148652798D-01
CGINFNORM=  2.4611374050D-07
CGTWONORM=  5.3607581370D-07
FLAG=       1

ITER=         82
FCNT=         86
GCNT=         83
TIME(csec.)=     33
```

```
  Broyden Tridiagonal function:    n=  10000

F=         6.6148652798D-01
CGINFNORM=  2.6941004472D-07
CGTWONORM=  9.3925165820D-07
FLAG=       1

ITER=         82
FCNT=         88
GCNT=         83
TIME(csec.)=     33
```

**-----ooooOoooooo-----**