

## NAME

stnma – CUTEr STENMIN test driver

## SYNOPSIS

stnma

## DESCRIPTION

The *stnma* main program test drives STENMIN on SIF problems from the CUTEr distribution.

STENMIN is an optimization package which uses tensor methods to minimize a nonlinear unconstrained problem where the Hessian is large and sparse. The software allows the user to select between a tensor method and a standard method based upon a quadratic model. The tensor method models the objective function by a fourth-order model, where the third- and fourth-order terms are chosen such that the extra cost of forming and solving the model is small.

STENMIN has been written and is distributed by

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## USAGE

Compile (but do not link) *stnmin.f*. The resulting object file *stnmin.o* should be placed in your directory `$MYCUTER/precision/bin/`.

Starting from the files distributed by A. Bouaricha, perform the following steps on a UNIX system (or equivalent actions on other systems).

- 1) Use the makefile supplied in the distribution to obtain the double precision version of the *stnmin.f* and *colmor.f* files:

```
f77 -o todble todble.f  
make stnmind.f  
make colmord.f
```

- 2) Concatenate these two files:

```
cat colmord.f >> stnmind.f
```

- 3) In the resulting *stnmind.f*, remove the BLAS functions DCOPY, DNRM2, DDOT and DSCAL. (CUTEr also uses these BLAS subroutines. They are contained in the CUTEr Fortran file named *linpac.f*. To avoid multiply defined subroutines when STENMIN is linked with the CUTE tools, the duplicate BLAS subroutines must be removed from STENMIN.)

- 4) Compile (but do not link) *stnmind.f*. The resulting object file *stnmind.o* should be placed in your directory `$MYCUTER/precision/bin/`.

- 5) You should also have a compiled double precision version of the Harwell Subroutine MA27 named *ma27d.o* in your directory `$MYCUTER/precision/bin/`. This subroutine is requested by STENMIN.

The steps for obtaining the single precision version of STENMIN are identical, except that the following substitutions should be made:

todble	-->	tosngl
stenmind.f	-->	stenmins.f
colmord.f	-->	colmors.f
DCOPY	-->	SCOPY
DNRM2	-->	SNRM2
DDOT	-->	SDOT
DSCAL	-->	SSCAL
stenmind.o	-->	stenmins.o
ma27d.o	-->	ma27s.o

Note: If you have the Harwell Subroutine Library already available on your system, an additional copy of MA27 is unnecessary. You should edit the file \$MYCUTER/bin/stn to set the BLAS variable adequately.

## NOTE

If no STENMIN.SPC file is present in the current directory, the default version is copied from \$CUTER/common/src/pkg/stenmin/. Default specifications are as follows:

1000	ILIM,	maximum number of iterations
0.00001	GRADTL,	relative gradient stopping tolerance
2	GRDFLG,	gradient availability & checking flag
2	HSNFLG,	Hessian availability & checking flag
1.0	FSCALE,	typical value of objective function
1.0	TYPX,	typical value of problem variables
1	METHOD,	method used (0=Newton, 1=tensor )
15	NDIGIT,	# accurate digits in function values
1	MSG,	output specifier

The reader is referred to the paper quoted below and the code itself if he or she wishes to modify these parameters.

## ENVIRONMENT

### CUTER

Parent directory for CUTER

### MYCUTER

Home directory of the installed CUTER distribution.

## AUTHORS

I. Bongartz, A.R. Conn, N.I.M. Gould, D. Orban and Ph.L. Toint

## SEE ALSO

*CUTER (and SifDec): A Constrained and Unconstrained Testing Environment, revisited*,  
N.I.M. Gould, D. Orban and Ph.L. Toint,  
ACM TOMS, **29**:4, pp.373-394, 2003.

*CUTE: Constrained and Unconstrained Testing Environment*, I. Bongartz, A.R. Conn, N.I.M. Gould and Ph.L. Toint, TOMS, **21**:1, pp.123-160, 1995.

*STENMIN: A software package for large, sparse unconstrained optimization using tensor methods*, A. Bouaricha, Preprint MCS-P451-0794, Argonne National Laboratory, Argonne, Illinois, 1994.

*Tensor methods for large, sparse unconstrained optimization using tensor methods*, A. Bouaricha, Preprint MCS-P452-0794, Argonne National Laboratory, Argonne, Illinois, 1994.

sdstn(1), stn(1).