## NAME

trn/sdtrn − CUTEr interface with the TRON solver.

## SYNOPSIS

**[sd]trn** [−decode] [−n] [−h] [−k] [−r] [−o *0|1*] [−l *secs*] [−f] [−b] [−a *1|2*] [−show] [[−param *name=value*[*,name=value...*]] [−force]] [−debug] [−L*path/to/lib*] [−−blas *keyword*] [−−lapack *keyword*] [*problem[.SIF]*]

## DESCRIPTION

*sdtrn* interfaces the TRON solver with the CUTEr tools and SIF-encoded problems. *sdtrn* applies the SIF decoder to the problem *problem.SIF* to produce the OUTSDIF.d file and the problem-dependant Fortan subroutines. If *problem.SIF* has already been decoded, the script *trn* may be run by itself. TRON minimizes an unconstrained or bound-constrained objective using a trust-region truncated-Newton method,

*sdtrn* is only included for backward compatibility with earlier versions of CUTE, and simply calls *trn* with the −*decode* flag.

*trn* sets the environment and calls *runpackage* to link all the needed libraries and modules for the TRON solver to solve the problem decoded from the SIF file and generates the executable.

### [sd]trn Options

You can start [sd]trn with the following options:

**−decode**
Applies the SIF decoder to the problem *problem.SIF* to produce the OUTSDIF.d file and the problem-dependant Fortan subroutines. It is redundant to call *sdtrn* with the −decode flag.

**−n** Use the load module if it already exists. Compiling a new load module is the default.

**−h** Print a short help message.

**−k** Keep the generated executable after use. May be useful when solving a particular problem with the same solver with different parameters. Deleting the executable after use is the default.

**−r** Discourage recompilation of the test problem. Default is to recompile object files.

**−o** *0|1*
Regulates the output level of *[sd]trn*. Verbose mode is **-o** 1, silent mode is **-o** 0. Silent mode is the default.

**−l** *secs*
sets a limit of *secs* second on TRON runtime. Unlimited cputime is the default.

**−f** Use automatic differentiation in Forward mode

**−b** Use automatic differentiation in Backward mode

**−a** *1|2*
−a 1 uses the older HSL automatic differentiation package AD01 and −a 2 uses the newer HSL automatic differentiation package AD02. −a 2 is the default.

**−show**
displays possible parameter settings for problem[.SIF]. Other options are ignored.

**−param**
cast problem[.SIF] against explicit parameter settings. Several parameter settings may be given as a comma-separated list following −param or using several −param flags. Use *sifdec -show problem* to view possible settings. If a setting is not allowed in the SIF file, no action is taken unless −*force* is present.

**−force**
Forces the setting of the parameters named using −*param* to the given values, even if those values are not predefined in the SIF file.

**−L***path/to/lib*
This option is passed directly to the linker and causes the path *path/to/lib* to be searched for libraries.

**−−blas** *keyword*
Overrides usage of the default *linpack* library packaged with CUTEr. Instead, use the BLAS library specified by *keyword*. The keyword *keyword* has one of two forms. The first, *-lmyblas* causes the linker to search for BLAS subprograms in the libmyblas.a library. The second, *none*, causes the linker to skip inclusion of any external BLAS. Use the first option if an optimized BLAS library is available on the host system, e.g., the ATLAS BLAS. The second option is useful for packages which already include the necessary BLAS subprograms.

**−−lapack** *keyword*
Overrides usage of the default *linpack* library packaged with CUTEr. Instead, use the LAPACK library specified by *keyword*. The keyword *keyword* has one of two forms. The first, *-lmylapack* causes the linker to search for LAPACK subroutines in the libmylapack.a library. The second, *none*, causes the linker to skip inclusion of any external LAPACK. Use the first option if an optimized LAPACK library is available on the host system. The second option is useful for packages which already include the necessary LAPACK subprograms.

*problem*
*problem.SIF* is the name of the file containing the SIF information on the problem to be solved.

## ENVIRONMENT

**CUTER**
Home directory for CUTEr

**MYCUTER**
Home directory of the installed CUTEr distribution.

**MASTSIF**
A pointer to the directory containing the CUTEr problems collection. If this variable is not set, the current directory is searched for *problem.SIF*. If it is set, the current directory is searched first, and if *problem.SIF* is not found there, $MASTSIF is searched.

## AUTHORS

N. I. M. Gould, D. Orban and Ph. L. Toint

## NOTES

TRON was written by Chih-Jen Lin and Jorge More' (Argonne National Labs.).

## 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, ACM TOMS, **21**:1, pp.123-160, 1995.

*Newton's method for large bound-constrained optimization problems*, C. Lin and J. J. More', SIAM Journal on Optimization, **9**:4, pp 1100-1127, 1999.

sifdecode(1), gen(1), trnma(3).