

**NAME**

CUTEST\_creport\_threaded – CUTEst tool to obtain statistics concerning function evaluation and CPU time used.

**SYNOPSIS**

CALL CUTEST\_creport\_threaded( status, CALLS, TIME, thread )

For real rather than double precision arguments, instead

CALL CUTEST\_creport\_threaded\_s( ... )

and for quadruple precision arguments, when available,

CALL CUTEST\_creport\_threaded\_q( ... )

**DESCRIPTION**

The CUTEST\_creport\_threaded subroutine obtains statistics concerning function evaluation and CPU time used for constrained optimization in a standardized format.

The problem under consideration is to minimize or maximize an objective function  $f(x)$  over all  $x \in R^n$  subject to general equations  $c_i(x) = 0$ , ( $i \in 1, \dots, m_E$ ), general inequalities  $c_i^l \leq c_i(x) \leq c_i^u$  ( $i \in m_E + 1, \dots, m$ ), and simple bounds  $x^l \leq x \leq x^u$ . The objective function is group-partially separable and all constraint functions are partially separable.

**ARGUMENTS**

The arguments of CUTEST\_creport\_threaded are as follows

**status** [out] - integer

the output status: 0 for a successful call, 1 for an array allocation/deallocation error, 2 for an array bound error, 3 for an evaluation error, 4 for an out-of-range thread,

**CALLS** [out] - real array of length 7

gives the number of calls to the problem functions:

CALLS( 1 ): number of calls to the objective function

CALLS( 2 ): number of calls to the objective gradient

CALLS( 3 ): number of calls to the objective Hessian

CALLS( 4 ): number of Hessian times vector products

CALLS( 5 ): number of calls to the constraint functions

CALLS( 6 ): number of calls to the constraint gradients

CALLS( 7 ): number of calls to the constraint Hessians,

**TIME** [out] - real array of length 4:

TIME( 1 ): CPU time (in seconds) for CUTEST\_csetup\_threaded

TIME( 2 ): CPU time (in seconds) since the end of CUTEst\_csetup\_threaded

TIME( 3 ): elapsed system clock time (in seconds) for CUTEst\_csetup\_threaded

TIME( 4 ): elapsed system clock time (in seconds) since the end of CUTEst\_csetup\_threaded,

**thread** [in] - integer

statistics are for the specified thread; threads are numbered from 1 to the value threads set when calling CUTEst\_usetup\_threaded.

## NOTE

Note that CALLS(4), CALLS(5) and CALLS(6) may account for codes which allow the evaluation of a selection of constraints only and may thus be much smaller than the number of constraints times the number of iterations.

## AUTHORS

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## SEE ALSO

*CUTEst: a Constrained and Unconstrained Testing Environment with safe threads*,  
N.I.M. Gould, D. Orban and Ph.L. Toint,  
Computational Optimization and Applications **60**:3, pp.545-557, 2014.

*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.