NAME

> CUTEST_cish_threaded – CUTEst tool to evaluate the Hessian of an individual problem function, in sparse format.

SYNOPSIS

> CALL CUTEST_cish_threaded(status, n, X, iprob, nnzh, lh, H_val, H_row, H_col, thread)

> For real rather than double precision arguments, instead

> CALL CUTEST_cish_threaded_s(...)

> and for quadruple precision arguments, when available,

> CALL CUTEST_cish_threaded_q(...)

DESCRIPTION

> The CUTEST_cish_threaded subroutine evaluates the Hessian of a particular constraint function or the objective function for the problem decoded from a SIF file by the script *sifdecoder* at the point X, and possibly its gradient. The matrix is stored in sparse 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 $c_i(x) = 0$, $(i \in 1, \ldots, m_E)$, general inequalities $c_i^l \le c_i(x) \le c_i^{u,}$ $(i \in m_E + 1, \ldots, m)$, and simple bounds $x^l \le x \le x^{u.}$ The objective function is group-partially separable and all constraint functions are partially separable.

ARGUMENTS

> The arguments of CUTEST_cish_threaded are as follows

> **status** [out] - integer
> > the outputr status: 0 for a succesful 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,

> **n** [in] - integer
> > the number of variables for the problem,

> **X** [in] - real/double precision
> > an array which gives the current estimate of the solution of the problem,

> **iprob** [in] - integer
> > the number of the problem function to be considered. If iprob = 0, the Hessian of the objective function will be evaluated, while if iprob = i > 0, that of the i-th constraint will be evaluated.

> **nnzh** [out] - integer
> > the number of nonzeros in H_val,

> **lh** [in] - integer
> > the actual declared dimensions of H_val, H_row and H_col,

> **H_val** [out] - real/double precision
> > an array which gives the values of the Hessian matrix of the required problem function evaluated at X. The i-th entry of H_val gives the value of the nonzero in row H_row(i) and column H_col(i). Only the upper triangular part of the Hessian is stored,

H_row [out] - integer
>   an array which gives the row indices of the nonzeros of the required Hessian matrix evaluated at X,

H_col [out] - integer
>   an array which gives the column indices of the nonzeros of the required Hessian matrix evaluated at X, and

thread [in] - integer
>   thread chosen for the evaluation; threads are numbered from 1 to the value threads set when calling CUTEST_csetup_threaded.

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

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.

sifdecoder(1).