

NAME

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

SYNOPSIS

CALL CUTEST_cish(status, n, X, iprob, nnzh, lh, H_val, H_row, H_col)

DESCRIPTION

The CUTEST_cish 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 $c_i(x) = 0$, ($i \in 1, \dots, m_E$), general inequalities $c_i^l(x) \leq c_i(x) \leq c_i^u(x)$, ($i \in m_E + 1, \dots, m$), 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_cish 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,

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, and

H_col [out] - integer

an array which gives the column indices of the nonzeros of the required Hessian matrix evaluated at X.

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,

Technical Report, Rutherford Appleton Laboratory, 2013.

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).