

**NAME**

CUTEST\_cdimse – CUTEst tool to determine the number of nonzeros required to store the Hessian of the Lagrangian.

**SYNOPSIS**

CALL CUTEST\_cdimse( status, ne, he\_val\_ne, he\_row\_ne )

**DESCRIPTION**

The CUTEST\_cdimse subroutine determines the number of nonzero elements required to store the Hessian matrix of the Lagrangian function for the problem decoded from a SIF file by the script *sifdecoder*. The matrix is stored in sparse "finite element" format

$$H = \sum_{e=1}^{ne} H_e,$$

where each square symmetric element  $H_e$  involves a small subset of the rows of the Hessian matrix.

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\_cdimse 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,

**ne** [out] - integer

the number of "finite-elements" used,

**he\_val\_ne** [out] - integer

the dimension of the array needed to store the real values of the Hessian, taking all the elements into account (i.e. the dimension of the array HE\_val).

**he\_row\_ne** [out] - integer

the dimension of the array needed to store the integer values of the Hessian (i.e. the dimension of the array HE\_row).

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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.

cutest\_ceh(3M), cutest\_csgreh(3M), sifdecoder(1).