NAME

CUTEST_csgrshp − CUTEst tool to evaluate the sparsity patterns of the constraints gradients and gradient of objective/Lagrangian function, and the Hessian of the Lagrangian.

SYNOPSIS

CALL CUTEST_csgrshp(status, n, nnzj, lj, J_var, J_fun, nnzh, lh, H_row, H_col)

DESCRIPTION

The CUTEST_csgrshp subroutine evaluates sparsity pattern used when storing the gradients of the general constraints and of either the objective function or the Lagrangian function $l(x, y) = f(x) + y^T c(x)$, as well as the Hessian of the Lagrangian function, corresponding to the problem decoded from a SIF file by the script *sifdecoder*.

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 $c_i^l \leq c_i(x) \leq c_i^{u,}$ $(i \in m_E + 1, \ldots, m)$, 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_csgrshp 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,

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

nnzj [out] - integer
the number of nonzeros in J_var and J_fun,

lj [in] - integer
the actual declared dimensions of J_var and J_fun,

J_var [out] - integer
an array whose i-th component is the index of the variable with respect to which the derivative is taken,

J_fun [out] - integer
an array whose i-th component is the index of the problem function whose derivative is taken. J_fun(i) = 0 indicates the objective or Lagrangian function, while J_fun(i) = j > 0 indicates the j-th general constraint function.

nnzh [out] - integer
the number of nonzeros in the Hessian matrix,

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

H_row [out] - integer
an array which gives the row indices of the nonzeros of the Hessian matrix of the Lagrangian function; only the upper triangular part of the Hessian is stored, and

H_col [out] - integer
an array which gives the column indices of the nonzeros of the Hessian matrix of the Lagrangian function corresponding to the row indices in H_row.

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,
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