

**NAME**

CUTEST\_csgrp – CUTEst tool to evaluate the sparsity pattern of the constraints gradients and gradient of objective/Lagrangian function.

**SYNOPSIS**

CALL CUTEST\_csgrp( status, n, nnzj, lj, J\_var, J\_fun )

**DESCRIPTION**

The CUTEST\_csgrp subroutine evaluates sparsity pattern used when storing the gradients of the general constraints and of either the objective function or the Lagrangian function  $l(x, y) = f(x) + y^T c(x)$  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  $c_i(x) = 0$ , ( $i \in 1, \dots, m_E$ ), 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\_csgrp 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,

**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.

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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.

cutest\_csgrp(3M), sifdecoder(1).