## NAME

CUTEST_cisgr − CUTEst tool to evaluate the gradient of a problem function in sparse format

## SYNOPSIS

CALL CUTEST_cisgr( status, n, iprob, X, nnzg, lg, G_val, G_var )

For real rather than double precision arguments, instead

CALL CUTEST_cisgr_s( ... )

and for quadruple precision arguments, when available,

CALL CUTEST_cisgr_q( ... )

## DESCRIPTION

The CUTEST_cisgr subroutine evaluates the gradient of either the objective function or a constraint function of the problem decoded from a SIF file by the script *sifdecoder* at the point X, in the constrained minimization case. The gradient 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 $c_i^l \leq c_i(x) \leq c_i^u$, $(i \in m_E + 1, \ldots, m)$, 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_cisgr 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,

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

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

**nnzg** [out] - integer
the number of nonzeros in G_val,

**lg** [in] - integer
the declared length of G_val and G_var,

**G_val** [out] - real/double precision
an array which gives the nonzeros of the gradient of constraint function icon evaluated at X. The i-th entry of G_val gives the value of the derivative with respect to variable G_var(i) of function icon.

**G_var** [out] - integer
an array whose i-th component is the index of the variable with respect to which G_val(i) is the derivative.

## 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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sifdecoder(1), cutest_cigr(3)