NAME

CUTEST_csetup − CUTEst tool to set up the data structures for constrained minimization.

SYNOPSIS

CALL CUTEST_csetup(status, input, out, io_buffer, n, m, X, X_l, X_u, Y, C_l, C_u, EQUATN, LINEAR, e_order, l_order, v_order)

For real rather than double precision arguments, instead

CALL CUTEST_csetup_s(...)

and for quadruple precision arguments, when available,

CALL CUTEST_csetup_q(...)

DESCRIPTION

The CUTEST_csetup subroutine sets up the correct data structures for subsequent computations on 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_csetup 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,

input [in] - integer
the unit number for the decoded data; the unit from which OUTSDIF.d is read,

out [in] - integer
the unit number for any error messages,

io_buffer [in] - integer
the unit number for any internal input/output,

n [inout] - integer
on input, the declared dimesions of X, X_l and X_u (see argument n in CUTEST_cdimen). On output, the number of variables for the problem,

m [inout] - integer
on input, the declared dimesions of Y, C_l, C_u, EQUATN and LINEAR (see argument m in CUTEST_cdimen). On output, the total number of general constraints,

X [out] - real/double precision
an array that gives the initial estimate of the solution of the problem,

X_l [out] - real/double precision
an array that gives lower bounds on the variables,

X_u [out] - real/double precision
an array that gives upper bounds on the variables,

Y [out] - real/double precision
an array that gives the initial estimate of the Lagrange multipliers at the solution of the problem. By convention, the signs of the Lagrange multipliers Y are set so the Lagrangian function can be written as $l(x, y) = f(x) + y^T c(x)$,

C_l [out] - real/double precision
an array that gives lower bounds on the inequality constraints,

C_u [out] - real/double precision
an array that gives upper bounds on the inequality constraints,

EQUATN [out] - logical
a logical array whose i-th component is .TRUE. if the i-th constraint is an equation (i in E) and .FALSE. if the constraint is an inequality (i in I),

LINEAR [out] - logical
a logical array whose i-th component is .TRUE. if the i-th constraint is linear or affine and .FALSE. otherwise,

e_order [in] - integer
if the user wishes the general equations to occur before the general inequalities in the list of constraints, e_order must be set to 1. If the general equations should follow the general inequalities, e_order must be set to 2. If the order is unimportant, e_order should be set to 0; any value except 1 and 2 will be interpreted as 0,

l_order [in] - integer
if the user wishes the general linear (or affine) constraints to occur before the general nonlinear ones in the list of constraints, l_order must be set to 1. If the general linear constraints should follow the general nonlinear ones, l_order must be set to 2. If the order is unimportant, l_order should be set to 0; any value except 1 and 2 will be interpreted as 0,

v_order [in] - integer
if the user wishes the nonlinear variables to occur before those that only appear linearly in the problem, in the list of variables, v_order must be set to 1; within the nonlinear variables the smaller set of either the nonlinear objective or nonlinear Jacobian variables will appear first. If the nonlinear variables must follow the linear ones, v_order should be set to 2. If the order is unimportant, v_order should be set to 0; any value except 1 and 2 will be interpreted as 0.

APPLICATION USAGE

A call to CUTEST_csetup must precede calls to other evaluation tools, except CUTEST_cdimen, for generally-constrained problems.

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,
ACM TOMS, **21**:1, pp.123-160, 1995.

cutest_usetup(3M), cutest_cdimen(3M), sifdecoder(1).