

NAME

CUTEST_chprod_threaded – CUTEst tool to form the matrix-vector product of a vector with the Hessian matrix of the Lagrangian.

SYNOPSIS

CALL CUTEST_chprod_threaded(status, n, m, goth, X, Y, VECTOR, RESULT, thread)

For real rather than double precision arguments, instead

CALL CUTEST_chprod_threaded_s(...)

and for quadruple precision arguments, when available,

CALL CUTEST_chprod_threaded_q(...)

DESCRIPTION

The CUTEST_chprod_threaded subroutine forms the product of a vector with the Hessian matrix of 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* at the point $(x, y) = (X, Y)$.

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_chprod_threaded 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, 4 for an out-of-range thread,

n [in] - integer

the number of variables for the problem,

m [in] - integer

the total number of general constraints,

goth [in] - logical

a logical variable which specifies whether the first and second derivatives of the groups and elements have already been set (goth = .TRUE.) or if they should be computed (goth = .FALSE.),

X [in] - real/double precision

when goth = .FALSE., the derivatives will be evaluated at X. Otherwise X is not used.

Y [in] - real/double precision

when goth = .FALSE., the derivatives will be evaluated with Lagrange multipliers Y. Otherwise Y is not used,

VECTOR [in] - real/double precision

an array which gives the vector whose product with the Hessian is required,

RESULT [out] - real/double precision

an array which gives the result of multiplying the Hessian by VECTOR.

NOTE

goth should be set to .TRUE. whenever

(1)

a call has been made to CUTEst_cdh_threaded, CUTEst_csh_threaded, CUTEst_cgrrdh_threaded or CUTEst_csgrsh_threaded at the current point, or

(2)

a previous call to CUTEst_chprod_threaded, with goth = .FALSE., at the current point has been made.

Otherwise, it should be set .FALSE.,

thread [out] - integer

thread chosen for the evaluation; threads are numbered from 1 to the value threads set when calling CUTEst_csetup_threaded.

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.

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