## NAME

lbbma – CUTEr L-BFGS-B test driver

## SYNOPSIS

lbbma

## DESCRIPTION

The *lbbma* main program test drives L-BFGS-B on SIF problems from the CUTEr distribution.

The L-BFGS-B package is a limited-memory algorithm for bound-constrained minimization by Richard Byrd (U. Colorado at Boulder) and P. Lu, Jorge Nocedal. and. C. Zhu (Northwestern U.)

## USAGE

The L-BFGS-B file routines.f should be edited to remove the subroutines TIMER, DNRM2, DAXPY, DCOPY, DDOT and DSCAL, and renamed lbfgsb.f. It should then be compiled, and the f resulting file lbfgsb.o placed in (or symbolically linked to) the directory $MYCUTER/double/bin.

There is no single-precision version.

## NOTE

If no LBFGSB.SPC file is present in the current directory, the default version is copied from $CUTER/common/src/pkg/lbfgsb/. Default specifications are as follows:

```
    5  M,      the maximum number of variable metric corrections
10000  MAXIT,  the maximum number of iterations
   -1  IPRINT  print level (<0,none,=0,one line/iteration,>1,more detail)
1.0D+7  FACTR,  the function accuracy tolerence (see hint below)
1.0D-5  PGTOL,  the absolute projected gradient decrease required
```

Hint - the iteration will stop when

```
(f^k - f^{k+1})/max{|f^k|,|f^{k+1}|,1} <= factr*epsmch
```

where epsmch is the machine precision, which is automatically generated by the code. Typical values for factr: 1.D+12 for low accuracy; 1.D+7 for moderate accuracy; 1.D+1 for extremely high accuracy.

The reader is referred to the paper quoted below and the code itself if he or she wishes to modify these parameters.

## ENVIRONMENT

**CUTER**

Parent directory for CUTEr

**MYCUTER**

Home directory of the installed CUTEr distribution.

## AUTHORS

I. Bongartz, A.R. Conn, N.I.M. Gould, D. Orban and Ph.L. Toint

## SEE ALSO

*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.

*Algorithm 778. L-BFGS-B: Fortran subroutines for large-scale bound constrained optimization*, C. Zhu, R. H. Byrd, P. Lu and J. Nocedal ACM TOMS, **23**:4, pp.550-560, 1997.

sdlbb(1), lbb(1).