NAG Toolbox for MATLAB

e04mh

1 Purpose

To supply individual optional parameters to e04mf.

2 Syntax

```
[lwsav, iwsav, rwsav, inform] = e04mh(str, lwsav, iwsav, rwsav)
```

3 Description

e04mh may be used to supply values for optional parameters to e04mf. It is only necessary to call e04mh for those parameters whose values are to be different from their default values. One call to e04mh sets one parameter value.

Each optional parameter is defined by a single character string, of up to 72 characters, consisting of one or more items. The items associated with a given option must be separated by spaces, or equals signs [=]. Alphabetic characters may be upper or lower case. The string

```
Print Level = 1
```

is an example of a string used to set an optional parameter. For each option the string contains one or more of the following items:

– a mandatory keyword;

– a phrase that qualifies the keyword;

– a number that specifies an integer or double value. Such numbers may be up to 16 contiguous characters in Fortran's I, F, E or D formats, terminated by a space if this is not the last item on the line.

Blank strings and comments are ignored. A comment begins with an asterisk (*) and all subsequent characters in the string are regarded as part of the comment.

For e04mh, each user-specified option is normally printed as it is defined, on the current advisory message unit (see x04ab), but this printing may be suppressed using the keyword **Nolist**. Thus the statement

```
[lwsav, iwsav, rwsav, inform] = e04mh('Nolist', lwsav, iwsav, rwsav);
```

suppresses printing of this and subsequent options. Printing will automatically be turned on again after a call to e04mf and may be turned on again at any time using the keyword **List**.

For e04mh printing is turned off by default, but may be turned on at any time using the keyword **List**.

Optional parameter settings are preserved following a call to e04mf and so the keyword **Defaults** is provided to allow you to reset all the optional parameters to their default values before a subsequent call to e04mf.

A complete list of optional parameters, their abbreviations, synonyms and default values is given in Section 11 of the document for e04mf.

4 References

None.

5 Parameters

5.1 Compulsory Input Parameters

1: **str – string**

A single valid option string (as described in Section 3 and in Section 11 of the document for e04mf).

2: **lwsav**(**120**) **– logical array**
3: **iwsav**(**610**) **– int32 array**
4: **rwsav**(**475**) **– double array**

The arrays **lwsav**, **iwsav** and **rwsav** **must not** be altered between calls to any of the functions e04wb, e04mf or e04mh.

5.2 Optional Input Parameters

None.

5.3 Input Parameters Omitted from the MATLAB Interface

None.

5.4 Output Parameters

1: **lwsav**(**120**) **– logical array**
2: **iwsav**(**610**) **– int32 array**
3: **rwsav**(**475**) **– double array**

The arrays **lwsav**, **iwsav** and **rwsav** **must not** be altered between calls to any of the functions e04wb, e04mf or e04mh.

4: **inform – int32 scalar**

Contains zero if a valid option string has been supplied and a value > 0 otherwise (see Section 6).

6 Error Indicators and Warnings

Errors or warnings detected by the function:

inform $= 5$

The supplied option is invalid. Check that the keywords are neither ambiguous nor misspelt.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

```
a = [1, 1, 1, 1, 1, 1, 1;
     0.15, 0.04, 0.02, 0.04, 0.02, 0.01, 0.03;
     0.03, 0.05, 0.08, 0.02, 0.06, 0.01, 0;
     0.02, 0.04, 0.01, 0.02, 0.02, 0, 0;
```

```
     0.02, 0.03, 0, 0, 0.01, 0, 0;
     0.7, 0.75, 0.8, 0.75, 0.8, 0.97, 0;
     0.02, 0.06, 0.08, 0.12, 0.02, 0.01, 0.97];
bl = [-0.01;
     -0.1;
     -0.01;
     -0.04;
     -0.1;
     -0.01;
     -0.01;
     -0.13;
     -9.999999999999999e+24;
     -9.999999999999999e+24;
     -9.999999999999999e+24;
     -9.999999999999999e+24;
     -0.0992;
     -0.003];
bu = [0.01;
     0.15;
     0.03;
     0.02;
     0.05;
     9.999999999999999e+24;
     9.999999999999999e+24;
     -0.13;
     -0.0049000000000000001;
     -0.0064;
     -0.0037;
     -0.0012;
     9.999999999999999e+24;
     0.002];
cvec = [-0.02; -0.2; -0.2; -0.2; -0.2; 0.04; 0.04];
istate = zeros(14, 1, 'int32');
x = [-0.01;
     -0.03;
     0;
     -0.01;
     -0.1;
     0.02;
     0.01];
[cwsav,lwsav,iwsav,rwsav,ifail] = e04wb('e04mf');

[lwsav, iwsav, rwsav, inform] = e04mh('Print Level = 1', lwsav, iwsav,
rwsav);
[lwsav, iwsav, rwsav, inform] = e04mh('Check Frequency = 10', lwsav,
iwsav, rwsav);
[lwsav, iwsav, rwsav, inform] = ...
    e04mh('Infinite Bound Size = 1.0d+25', lwsav, iwsav, rwsav);

[istateOut, xOut, iter, obj, ax, clamda, lwsav, iwsav, rwsav, ifail] =
...
    e04mf(a, bl, bu, cvec, istate, x, lwsav, iwsav, rwsav)
```

```
*** E04MFF

 Parameters
 ----------

 Problem type...........        LP

 Linear constraints.....          7       Feasibility tolerance..  1.05E-
08
 Variables..............          7       Optimality tolerance...  1.05E-
08

 Infinite bound size....  1.00E+25       COLD start.............
 Infinite step size.....  1.00E+25        EPS (machine precision)  1.11E-
16

  Check frequency........            10          Expand frequency.......
```

```
5
 Minimum sum of infeas..         NO        Crash tolerance........  1.00E-
02

  Print  level.............              1           Iteration  limit........
70
 Monitoring file........        -1

 Workspace provided is     IWORK(      17),  WORK(     182).
 To solve problem we need  IWORK(      17),  WORK(     182).


 Varbl  State       Value          Lower  Bound    Upper  Bound     Lagr  Mult
Slack

 V   1    LL  -1.000000E-02 -1.000000E-02  1.000000E-02  0.3301         .
 V   2    LL  -0.100000     -0.100000      0.150000      1.4384E-02     .
 V   3    UL   3.000000E-02 -1.000000E-02  3.000000E-02 -9.0997E-02     .
 V   4    UL   2.000000E-02 -4.000000E-02  2.000000E-02 -7.6612E-02     .
  V    5      FR   -6.748534E-02  -0.100000         5.000000E-02          .
3.2515E-02
  V    6      FR   -2.280130E-03  -1.000000E-02         None              .
7.7199E-03
  V    7      FR   -2.345277E-04  -1.000000E-02         None              .
9.7655E-03


 L  Con  State       Value          Lower  Bound    Upper  Bound     Lagr  Mult
Slack

 L   1     EQ  -0.130000      -0.130000      -0.130000       -1.431      -
2.7756E-17
  L    2      FR   -5.479544E-03         None       -4.900000E-03          .
5.7954E-04
  L    3      FR   -6.571922E-03         None       -6.400000E-03          .
1.7192E-04
  L    4      FR   -4.849707E-03         None       -3.700000E-03          .
1.1497E-03
  L    5      FR   -3.874853E-03         None       -1.200000E-03          .
2.6749E-03
  L   6     LL   -9.920000E-02 -9.920000E-02       None         1.501      -
2.7756E-17
   L     7       LL    -3.000000E-03  -3.000000E-03    2.000000E-03     1.517
4.3368E-18

 Exit E04MFF - Optimal LP solution.

 Final LP objective value =   0.2359648E-01

 Exit from LP problem after     7 iterations.
istateOut =
           1
           1
           2
           2
           0
           0
           0
           3
           0
           0
           0
           0
           1
           1
xOut =
   -0.0100
   -0.1000
    0.0300
    0.0200
```

```
   -0.0675
   -0.0023
   -0.0002
iter =
           7
obj =
    0.0236
ax =
   -0.1300
   -0.0055
   -0.0066
   -0.0048
   -0.0039
   -0.0992
   -0.0030
clamda =
    0.3301
    0.0144
   -0.0910
   -0.0766
         0
         0
         0
   -1.4311
         0
         0
         0
         0
    1.5010
    1.5166
lwsav =
     array elided
iwsav =
     array elided
rwsav =
     array elided
ifail =
           0
```