NAG Library Routine Document

H02BVF

Note: before using this routine, please read the Users' Note for your implementation to check the interpretation of ***bold italicised*** terms and other implementation-dependent details.

1   Purpose

H02BVF prints the solution to a linear or integer programming problem computed by E04MFF/E04MFA or H02BBF and H02BZF, with user-supplied names for the rows and columns.

2   Specification

```
SUBROUTINE H02BVF (N, M, A, LDA, BL, BU, X, CLAMDA, ISTATE, CRNAME, IFAIL)

INTEGER            N, M, LDA, ISTATE(N+M), IFAIL
REAL (KIND=nag_wp) A(LDA,*), BL(N+M), BU(N+M), X(N), CLAMDA(N+M)
CHARACTER(8)       CRNAME(N+M)
```

3   Description

H02BVF prints the solution to a linear or integer programming problem with user-supplied names for the rows and columns. All output is written to the current advisory message unit (as defined by X04ABF). The routine must be preceded in the same program by calls to H02BUF and either E04MFF/E04MFA (if an LP problem has been solved) or H02BBF and H02BZF (if an IP problem has been solved). The documents for E04MFF/E04MFA, H02BUF and/or H02BBF and H02BZF should be consulted for further details.

4   References

IBM (1971) MPSX – Mathematical programming system *Program Number 5734 XM4* IBM Trade Corporation, New York

5   Parameters

1:   N – INTEGER   *Input*

   On entry: the number of variables, as returned by H02BUF.

   Constraint: $N > 0$.

2:   M – INTEGER   *Input*

   On entry: the number of general linear constraints, as returned by H02BUF.

   Constraint: $M \geq 0$.

3:   A(LDA,∗) – REAL (KIND=nag_wp) array   *Input*

   Note: the second dimension of the array A must be at least N if $M > 0$ and at least 1 if $M = 0$.

   On entry: the matrix of general linear constraints, as returned by H02BUF.

4:   LDA – INTEGER   *Input*

   On entry: this **must** be the same parameter MAXM as supplied to H02BUF.

   Constraint: $LDA \geq \max(1, M)$.

5:    BL(N + M) – REAL (KIND=nag_wp) array *Input*

    On entry: the lower bounds for all the constraints, as returned by E04MFF/E04MFA or H02BZF.

6:    BU(N + M) – REAL (KIND=nag_wp) array *Input*

    On entry: the upper bounds for all the constraints, as returned by E04MFF/E04MFA or H02BZF.

7:    X(N) – REAL (KIND=nag_wp) array *Input*

    On entry: the solution to the problem, as returned by E04MFF/E04MFA or H02BBF.

8:    CLAMDA(N + M) – REAL (KIND=nag_wp) array *Input*

    On entry: the Lagrange-multipliers (reduced costs) for each constraint with respect to the working set, as returned by E04MFF/E04MFA or H02BZF.

9:    ISTATE(N + M) – INTEGER array *Input*

    On entry: the status of every constraint in the working set at the solution, as returned by E04MFF/E04MFA or H02BZF.

10:    CRNAME(N + M) – CHARACTER(8) array *Input*

    On entry: the user-defined names for all the variables and constraints, as returned by H02BUF.

11:    IFAIL – INTEGER *Input/Output*

    On entry: IFAIL must be set to 0, −1 or 1. If you are unfamiliar with this parameter you should refer to Section 3.3 in the Essential Introduction for details.

    For environments where it might be inappropriate to halt program execution when an error is detected, the value −1 or 1 is recommended. If the output of error messages is undesirable, then the value 1 is recommended. Otherwise, if you are not familiar with this parameter, the recommended value is 0. **When the value −1 or 1 is used it is essential to test the value of IFAIL on exit.**

    On exit: IFAIL = 0 unless the routine detects an error or a warning has been flagged (see Section 6).

6   Error Indicators and Warnings

If on entry IFAIL = 0 or −1, explanatory error messages are output on the current error message unit (as defined by X04AAF).

Errors or warnings detected by the routine:

IFAIL = 1

    On entry, N ≤ 0,
    or   M < 0,
    or   LDA < max(1, M).

7   Accuracy

Not applicable.

8   Further Comments

None.

9 Example

See Section 9 in H02BUF.