



**Warning:** Subroutine MB01 performs functions which are adequately treated by routines in other standard subroutine libraries (for example, LAPACK). The use of this routine is not recommended, and it may be removed from future releases of this library.

## 1 SUMMARY

Given an  $m$  by  $m$  real matrix  $\mathbf{A}=\{a_{ij}\}$ , this subroutine evaluates **the inverse matrix**  $\mathbf{A}^{-1}$ . The method is essentially that of simple Gaussian elimination with row interchanges. No checks on the condition of the matrix are made and no indication of the accuracy of the inverse is given. If the user is concerned about such matters he or she should consider the alternative subroutines in the library.

**ATTRIBUTES** — **Version:** 1.0.0. **Types:** MB01C, MB01CD. **Original date:** February 1975. **Origin:** Harwell.

## 2 HOW TO USE THE PACKAGE

### 2.1 Argument List

*The single precision version*

```
CALL MB01C(A,M,IA,IW,W)
```

*The double precision version*

```
CALL MB01CD(A,M,IA,IW,W)
```

- A** is a two-dimensional REAL (DOUBLE PRECISION in the D version) array which must be set by the user to the elements of the matrix  $\mathbf{A}$ , i.e.  $A(i,j) = a_{ij}$ . The array is overwritten by the subroutine with the elements of the inverse matrix  $\mathbf{A}^{-1}$ .
- M** is an INTEGER variable which must be set by the user to  $m$ , the dimension of the matrix. It is not altered by the subroutine. **Restriction:**  $m \geq 1$ .
- IA** is an INTEGER variable which must be set by the user to the first dimension of the array A, e.g. if space is allocated with DIMENSION A(100,100), set IA to 100. It is not altered by the subroutine.
- IW** is an INTEGER array of length at least  $m$  which must be provided by the user for the subroutine to use as workspace.
- W** is a REAL (DOUBLE PRECISION in the D version) array of length at least  $m$  which must be provided for the subroutine use as workspace.

### 2.2 The common area and diagnostic messages

*The single precision version*

```
COMMON/MB01D/LP,IFLAG
```

*The double precision version*

```
COMMON/MB01DD/LP,IFLAG
```

- LP** is an INTEGER variable with default value 6, set by BLOCK DATA, that specifies the stream number for diagnostic messages. If the user resets  $LP \leq 0$ , then no diagnostic messages are printed.

IFLAG is an INTEGER variable which on return may have one of the following values:

- 0 successful return
- 1 M is not positive
- 2 the matrix is singular

### **3 GENERAL INFORMATION**

**Use of common:** see section 2.2

**Workspace:** provided by the user in IW and W

**Other routines called directly:** none

**Input/output:** none

**Restrictions:**  $m \geq 1$

### **4 METHOD**

The method is that of Gaussian elimination with row interchanges and double precision accumulation of inner products. See 'Triangular Decomposition Methods', Modern Computing Methods, N.P.L., 1957.