

NAG Toolbox for MATLAB

x04eb

1 Purpose

x04eb prints an integer matrix stored in a two-dimensional array.

2 Syntax

```
[ifail] = x04eb(matrix, diag, a, form, title, labrow, rlabs, labcol,  
clabs, ncols, indent, 'm', m, 'n', n)
```

3 Description

x04eb prints an integer matrix, or part of it, using a format specifier supplied by you. The matrix is output to the unit defined by x04ab.

4 References

None.

5 Parameters

5.1 Compulsory Input Parameters

1: **matrix** – string

Indicates the part of the matrix to be printed.

matrix = 'G' (General)

The whole of the rectangular matrix.

matrix = 'L' (Lower)

The lower triangle of the matrix, or the lower trapezium if the matrix has more rows than columns.

matrix = 'U' (Upper)

The upper triangle of the matrix, or the upper trapezium if the matrix has more columns than rows.

Constraint: **matrix** = 'G', 'L' or 'U'.

2: **diag** – string

Unless **matrix** = 'G', **diag** must specify whether the diagonal elements of the matrix are to be printed.

diag = 'B' (Blank)

The diagonal elements of the matrix are not referenced and not printed.

diag = 'U' (Unit diagonal)

The diagonal elements of the matrix are not referenced, but are assumed all to be unity, and are printed as such.

diag = 'N' (Non-unit diagonal)

The diagonal elements of the matrix are referenced and printed.

If **matrix** = 'G', then **diag** need not be set.

Constraint: if **matrix** $\neq$ 'G', **diag** = 'B', 'U' or 'N'.

3: **a(lda,*)** – int32 array

The first dimension of the array **a** must be at least $\max(1, \mathbf{m})$

The second dimension of the array must be at least $\max(1, \mathbf{n})$

The matrix to be printed. Only the elements that will be referred to, as specified by parameters **matrix** and **diag**, need be set.

4: **form** – string

A valid Fortran format code. This may be any format code allowed on the system, whether it is standard Fortran or not. **form** is used to print elements of the matrix *A*. It may or may not be enclosed in brackets. Examples of valid values for **form** are 'I6', 'I4,2X'.

In addition, there is a special code which forces x04eb to choose its own format code:

form = "

x04eb will choose a format code such that numbers will be printed using the smallest edit descriptor that is large enough to hold all the numbers to be printed.

Constraint: the character length of **form** must be ≤ 80 .

5: **title** – string

A title to be printed above the matrix.

If **title** = ' ', no title (and no blank line) will be printed.

If **title** contains more than **ncols** characters, the contents of **title** will be wrapped onto more than one line, with the break after **ncols** characters.

Any trailing blank characters in **title** are ignored.

6: **labrow** – string

Indicates the type of labelling to be applied to the rows of the matrix.

labrow = 'N'

Prints no row labels.

labrow = 'I'

Prints integer row labels.

labrow = 'C'

Prints character labels, which must be supplied in array **rlabs**.

Constraint: **labrow** = 'N', 'I' or 'C'.

7: **rlabs(*) – string array**

Note: the dimension of the array **rlabs** must be at least **m** if **labrow** = 'C', and at least 1 otherwise. If **labrow** = 'C', must contain labels for the rows of the matrix.

Labels are right-justified when output, in a field which is as wide as necessary to hold the longest row label. Note that this field width is subtracted from the number of usable columns, **ncols**.

8: **labcol – string**

Indicates the type of labelling to be applied to the columns of the matrix.

labcol = 'N'

Prints no column labels.

labcol = 'I'

Prints integer column labels.

labcol = 'C'

Prints character labels, which must be supplied in array **clabs**.

Constraint: **labcol** = 'N', 'I' or 'C'.

9: **clabs(*) – string array**

Note: the dimension of the array **clabs** must be at least **n** if **labcol** = 'C', and at least 1 otherwise. If **labcol** = 'C', must contain labels for the columns of the matrix.

Labels are right-justified when output. Any label that is too long for the column width, which is determined by **form**, is truncated.

10: **ncols – int32 scalar**

The maximum output record length. If the number of columns of the matrix is too large to be accommodated in **ncols** characters, the matrix will be printed in parts, containing the largest possible number of matrix columns, and each part separated by a blank line.

ncols must be large enough to hold at least one column of the matrix using the format specifier in **form**. If a value less than 0 or greater than 132 is supplied for **ncols**, then the value 80 is used instead.

11: **indent – int32 scalar**

The number of columns by which the matrix (and any title and labels) should be indented. The effective value of **ncols** is reduced by **indent** columns. If a value less than 0 or greater than **ncols** is supplied for **indent**, the value 0 is used instead.

5.2 Optional Input Parameters

1: **m – int32 scalar**2: **n – int32 scalar**

Default: The second dimension of the array **a**.

The number of rows and columns of the band matrix, respectively, to be printed.

If either **m** or **n** is less than 1, x04eb will exit immediately after printing **title**; no row or column labels are printed.

5.3 Input Parameters Omitted from the MATLAB Interface

lda

5.4 Output Parameters

1: **ifail** – int32 scalar

0 unless the function detects an error (see Section 6).

6 Error Indicators and Warnings

Errors or warnings detected by the function:

ifail = 1

On entry, **matrix** $\neq$ 'G', 'L' or 'U'.

ifail = 2

On entry, **matrix** = 'L' or 'U', but **diag** $\neq$ 'N', 'U' or 'B'.

ifail = 3

On entry, **m** > **lda**.

ifail = 4

On entry, variable **form** is more than 80 characters long.

ifail = 5

The code supplied in **form** cannot be used to output a number. **form** probably has too wide a field width or contains an illegal edit descriptor.

ifail = 6

On entry, either **labrow** or **labcol** $\neq$ 'N', 'I' or 'C'.

ifail = 7

The quantity **ncols** – **indent** – *labwid* (where *labwid* is the width needed for the row labels) is not large enough to hold at least one column of the matrix.

7 Accuracy

Not applicable.

8 Example

```
matrix = 'General';
diag = ' ';
a = [int32(11), int32(12), int32(13), int32(14), int32(15);
     int32(21), int32(22), int32(23), int32(24), int32(25);
     int32(31), int32(32), int32(33), int32(34), int32(35)];
format = ' ';
title = 'Example 1: ';
labrow = 'C';
rlabs = {'Uno', 'Duo', 'Tre'};
labcol = 'Integer';
clabs = {' '};
ncols = int32(80);
indent = int32(0);
[ifail] = ...
    x04eb(matrix, diag, a, format, title, labrow, rlabs, labcol, clabs,
ncols, indent)
```

```
Example 1:
      1  2  3  4  5
Uno   11 12 13 14 15
Duo   21 22 23 24 25
Tre   31 32 33 34 35
ifail =
          0
```
