

NAG Toolbox for MATLAB

x04ca

1 Purpose

x04ca is an easy-to-use function to print a real matrix stored in a two-dimensional array.

2 Syntax

```
[ifail] = x04ca(matrix, diag, a, title, 'm', m, 'n', n)
```

3 Description

x04ca prints a double matrix. It is an easy-to-use driver for x04cb. The function uses default values for the format in which numbers are printed, for labelling the rows and columns, and for output record length.

x04ca will choose a format code such that numbers will be printed with an F8.4, an F11.4 or a 1PE13.4 format. The F8.4 code is chosen if the sizes of all the matrix elements to be printed lie between 0.001 and 1.0. The F11.4 code is chosen if the sizes of all the matrix elements to be printed lie between 0.001 and 9999.9999. Otherwise the 1PE13.4 code is chosen.

The matrix is printed with integer row and column labels, and with a maximum record length of 80.

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,*)** – double 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: **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 80 characters, the contents of **title** will be wrapped onto more than one line, with the break after 80 characters.

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

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, x04ca 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, **lda** < **m**.

7 Accuracy

Not applicable.

8 Further Comments

A call to x04ca is equivalent to a call to x04cb with the following argument values:

```
ncols = 80
indent = 0
labrow = 'I'
labcol = 'I'
form = ' '
```

9 Example

```
matrix = 'General';
diag = ' ';
a = [11, 12, 13, 14, 15;
     21, 22, 23, 24, 25;
     31, 32, 33, 34, 35];
title = 'Example 1: ';
[ifail] = x04ca(matrix, diag, a, title)
```

```
Example 1:
      1      2      3      4      5
1  11.0000  12.0000  13.0000  14.0000  15.0000
2  21.0000  22.0000  23.0000  24.0000  25.0000
3  31.0000  32.0000  33.0000  34.0000  35.0000
ifail =
      0
```