NAG Toolbox for MATLAB

x04dc

1 Purpose

x04dc is an easy-to-use function to print a ***complex*16*** triangular matrix stored in a packed one-dimensional array.

2 Syntax

```
[ifail] = x04dc(uplo, diag, n, a, title)
```

3 Description

x04dc prints a ***complex*16*** triangular matrix stored in packed form. It is an easy-to-use driver for x04dd. The function uses default values for the format in which numbers are printed, for labelling the rows and columns, and for output record length. The matrix must be packed by column.

x04dc 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 chosen code is used to print each complex element of the matrix with the real part above the imaginary part.

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: **uplo – string**

Indicates the type of the matrix to be printed

uplo = 'L' (Lower)

The matrix is lower triangular. In this case, the packed array **a** holds the matrix elements in the following order: $(1,1),(2,1),\ldots,(\mathbf{n},1),(2,2),(3,2),\ldots,(\mathbf{n},2),\cdot$

uplo = 'U' (Upper)

The matrix is upper triangular. In this case, the packed array **a** holds the matrix elements in the following order: $(1,1),(1,2),(2,2),(1,3),(2,3),(3,3),(1,4),\cdot$

Constraint: **uplo** = 'L' or 'U'.

2: **diag – string**

Indicates 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.

Constraint: **diag** = 'B', 'U' or 'N'.

3: **n – int32 scalar**

The order of the matrix to be printed.

If **n** is less than 1, x04dc will exit immediately after printing **title**; no row or column labels are printed.

4: **a**$(*)$ **– complex array**

Note: the dimension of the array **a** must be at least $\max(1, \mathbf{n} \times (\mathbf{n}+1)/2)$.

The matrix to be printed. Note that **a** must have space for the diagonal elements of the matrix, even if these are not stored.

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 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

None.

5.3 Input Parameters Omitted from the MATLAB Interface

None.

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, **uplo** $\neq$ 'L' or 'U'.

ifail = 2

On entry, **diag** $\neq$ 'N', 'U' or 'B'.

7 Accuracy

Not applicable.

8 Further Comments

A call to x04dc is equivalent to a call to x04dd with the following argument values:

```
ncols = 80
indent = 0
labrow = 'I'
labcol = 'I'
format = ' '
usefrm = 'A'
```

9 Example

```
uplo = 'Lower';
diag = 'Unit';
n = int32(3);
a = [complex(1, -1);
     complex(2, -2);
     complex(3, -3);
     complex(4, -4);
     complex(5, -5);
     complex(6, -6)];
title = 'Example 1:';
[ifail] = x04dc(uplo, diag, n, a, title)
```

```
Example 1:
              1          2          3
 1      1.0000
        0.0000

 2      2.0000     1.0000
       -2.0000     0.0000

 3      3.0000     5.0000     1.0000
       -3.0000    -5.0000     0.0000
ifail =
           0
```