

NAG Toolbox for MATLAB

x04de

1 Purpose

x04de is an easy-to-use function to print a *complex*16* band matrix stored in a packed two-dimensional array.

2 Syntax

```
[ifail] = x04de(m, n, kl, ku, a, title)
```

3 Description

x04de prints a *complex*16* band matrix stored in a packed two-dimensional array. It is an easy-to-use driver for x04df. The function uses default values for the format in which numbers are printed, for labelling the rows and columns, and for output record length.

x04de 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: **m** – int32 scalar

2: **n** – int32 scalar

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

If either **m** or **n** is less than 1, x04de will exit immediately after printing **title**; no row or column labels are printed.

3: **kl** – int32 scalar

The number of subdiagonals of the band matrix *A*.

Constraint: **kl** ≥ 0.

4: **ku** – int32 scalar

The number of superdiagonals of the band matrix *A*.

Constraint: **ku** ≥ 0.

5: **a(lda,*) – complex array**

The first dimension of the array **a** must be at least **kl** + **ku** + 1

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

The band matrix to be printed.

The matrix is stored in rows 1 to $k_l + k_u + 1$, more precisely, the element A_{ij} must be stored in

$$\mathbf{a}(k_u + 1 + i - j, j) \quad \text{for } \max(1, j - k_u) \leq i \leq \min(mj + k_l).$$

6: **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

lda

5.4 Output Parameters1: **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, **kl** < 0.

ifail = 2

On entry, **ku** < 0.

ifail = 3

On entry, **lda** < **kl** + **ku** + 1.

7 Accuracy

Not applicable.

8 Further Comments

A call to x04de is equivalent to a call to x04df with the following argument values:

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

```
usefrm = 'A'
```

9 Example

```
m = int32(5);
n = int32(5);
kl = int32(1);
ku = int32(1);
a = [complex(11, -11), complex(12, -12), complex(13, -13), complex(14, -
14), complex(15, -15);
      complex(21, -21), complex(22, -22), complex(23, -23), complex(24, -
24), complex(25, -25);
      complex(31, -31), complex(32, -32), complex(33, -33), complex(34, -
34), complex(35, -35)];
title = 'Band Matrix: ';
[ifail] = x04de(m, n, kl, ku, a, title)
```

```
Band Matrix:
      1      2      3      4      5
1    21.0000  12.0000
    -21.0000 -12.0000
2    31.0000  22.0000  13.0000
    -31.0000 -22.0000 -13.0000
3           32.0000  23.0000  14.0000
          -32.0000 -23.0000 -14.0000
4           33.0000  24.0000  15.0000
          -33.0000 -24.0000 -15.0000
5           34.0000  25.0000
          -34.0000 -25.0000
ifail =
      0
```