NAG Toolbox

nag_file_print_matrix_complex_gen (x04da)

1 Purpose

nag_file_print_matrix_complex_gen (x04da) is an easy-to-use function to print a complex matrix stored in a two-dimensional array.

2 Syntax

```
[ifail] = nag_file_print_matrix_complex_gen(matrix, diag, a, title, 'm', m, 'n', n)
[ifail] = x04da(matrix, diag, a, title, 'm', m, 'n', n)
```

3 Description

nag_file_print_matrix_complex_gen (x04da) prints a complex matrix. It is an easy-to-use driver for nag_file_print_matrix_complex_gen_comp (x04db). The function uses default values for the format in which numbers are printed, for labelling the rows and columns, and for output record length.

nag_file_print_matrix_complex_gen (x04da) 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 nag_file_set_unit_advisory (x04ab).

4 References

None.

5 Parameters

5.1 Compulsory Input Parameters

1: **matrix** – CHARACTER(1)

Indicates the part of the matrix to be printed.

matrix = 'G'
The whole of the rectangular matrix.

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

matrix = 'U'
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** – CHARACTER(1)

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

diag = 'B'
The diagonal elements of the matrix are not referenced and not printed.

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

diag = 'N'
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**$(lda,:)$ – COMPLEX (KIND=nag_wp) array

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

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

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

4: **title** – CHARACTER(*)

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** – INTEGER
2: **n** – INTEGER

Default: the first dimension of the array **a** and the second dimension of the array **a**.

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

If either **m** or **n** is less than 1, nag_file_print_matrix_complex_gen (x04da) will exit immediately after printing **title**; no row or column labels are printed.

5.3 Output Parameters

1: **ifail** – INTEGER

ifail = 0 unless the function detects an error (see Section 5).

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**.

ifail $= -99$

An unexpected error has been triggered by this routine. Please contact NAG.

ifail $= -399$

Your licence key may have expired or may not have been installed correctly.

ifail $= -999$

Dynamic memory allocation failed.

7 Accuracy

Not applicable.

8 Further Comments

A call to nag_file_print_matrix_complex_gen (x04da) is equivalent to a call to nag_file_print_matrix_complex_gen_comp (x04db) with the following argument values:

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

9 Example

This example program calls nag_file_print_matrix_complex_gen (x04da) twice, first to print a 4 by 3 rectangular matrix, and then to print a 4 by 4 lower triangular matrix.

9.1 Program Text

```
function x04da_example

fprintf('x04da example results\n\n');

nmax = 4;
b = zeros(nmax,nmax);
for j = 1:nmax
  b(j,:) = [1:nmax] + 10*j;
end

a = b - i*b;

% First matrix: 4x3 general matrix
mtitle = 'Example 1:';
matrix = 'General';
diag   = ' ';

[ifail] = x04da( ...
                 matrix, diag, a(:,1:3), mtitle);

fprintf('\n');
% Second matrix : 5x5 non-unit lower triangular
mtitle = 'Example 2:';
```

```
matrix = 'Lower';
diag   = 'Non-unit';

[ifail] = x04da( ...
                matrix, diag, a, mtitle);
```

9.2 Program Results

```
     x04da example results

 Example 1:
             1          2          3
 1     11.0000    12.0000    13.0000
      -11.0000   -12.0000   -13.0000

 2     21.0000    22.0000    23.0000
      -21.0000   -22.0000   -23.0000

 3     31.0000    32.0000    33.0000
      -31.0000   -32.0000   -33.0000

 4     41.0000    42.0000    43.0000
      -41.0000   -42.0000   -43.0000

 Example 2:
             1          2          3          4
 1     11.0000
      -11.0000

 2     21.0000    22.0000
      -21.0000   -22.0000

 3     31.0000    32.0000    33.0000
      -31.0000   -32.0000   -33.0000

 4     41.0000    42.0000    43.0000    44.0000
      -41.0000   -42.0000   -43.0000   -44.0000
```