

# NAG Library Function Document

## nag\_band\_real\_mat\_print (x04cec)

### 1 Purpose

nag\_band\_real\_mat\_print (x04cec) is an easy-to-use function to print a double band matrix .

### 2 Specification

```
#include <nag.h>
#include <nagx04.h>

void nag_band_real_mat_print (Nag_OrderType order, Integer m, Integer n,
    Integer kl, Integer ku, const double a[], Integer pda,
    const char *title, const char *outfile, NagError *fail)
```

### 3 Description

nag\_band\_real\_mat\_print (x04cec) prints a double band matrix stored in packed form. It is an easy-to-use driver for nag\_band\_real\_mat\_print\_comp (x04cfc). 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\_band\_real\_mat\_print (x04cec) will choose a format code such that numbers will be printed with a %8.4f, a %11.4f or a %13.4e format. The %8.4f code is chosen if the sizes of all the matrix elements to be printed lie between 0.001 and 1.0. The %11.4f code is chosen if the sizes of all the matrix elements to be printed lie between 0.001 and 9999.9999. Otherwise the %13.4e 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 file specified by **outfile** or, by default, to standard output.

### 4 References

None.

### 5 Arguments

1: **order** – Nag\_OrderType *Input*

*On entry:* the **order** argument specifies the two-dimensional storage scheme being used, i.e., row-major ordering or column-major ordering. C language defined storage is specified by **order** = Nag\_RowMajor. See Section 2.3.1.3 in How to Use the NAG Library and its Documentation for a more detailed explanation of the use of this argument.

*Constraint:* **order** = Nag\_RowMajor or Nag\_ColMajor.

2: **m** – Integer *Input*

3: **n** – Integer *Input*

*On entry:* the number of rows and columns of the band matrix, respectively, to be printed.

If either **m** or **n** is less than 1, nag\_band\_real\_mat\_print (x04cec) will exit immediately after printing **title**; no row or column labels are printed.

4: **kl** – Integer *Input*

*On entry:* the number of subdiagonals of the band matrix *A*.

*Constraint:* **kl** ≥ 0.

- 5: **ku** – Integer *Input*  
*On entry:* the number of superdiagonals of the band matrix *A*.  
*Constraint:* **ku** ≥ 0.
- 6: **a**[*dim*] – const double *Input*  
**Note:** the dimension, *dim*, of the array **a** must be at least  
 $\max(1, \mathbf{pda} \times \mathbf{n})$  when **order** = Nag\_ColMajor;  
 $\max(1, \mathbf{m} \times \mathbf{pda})$  when **order** = Nag\_RowMajor.  
*On entry:* the band matrix to be printed.  
This is stored as a notional two-dimensional array with row elements or column elements stored contiguously. The storage of elements  $A_{ij}$ , for row  $i = 1, \dots, m$  and column  $j = \max(1, i - k_l), \dots, \min(n, i + k_u)$ , depends on the **order** argument as follows:  
if **order** = Nag\_ColMajor,  $A_{ij}$  is stored as **a**[(*j* - 1) × **pda** + **ku** + *i* - *j*];  
if **order** = Nag\_RowMajor,  $A_{ij}$  is stored as **a**[(*i* - 1) × **pda** + **kl** + *j* - *i*].
- 7: **pda** – Integer *Input*  
*On entry:* the stride separating row or column elements (depending on the value of **order**) of the matrix *A* in the array **a**.  
*Constraint:* **pda** ≥ **kl** + **ku** + 1.
- 8: **title** – const char \* *Input*  
*On entry:* a title to be printed above the matrix.  
If **title** = **NULL**, 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.
- 9: **outfile** – const char \* *Input*  
*On entry:* the name of a file to which output will be directed. If **outfile** is **NULL** the output will be directed to standard output.
- 10: **fail** – NagError \* *Input/Output*  
The NAG error argument (see Section 2.7 in How to Use the NAG Library and its Documentation).

## 6 Error Indicators and Warnings

### NE\_ALLOC\_FAIL

Memory allocation failed.

### NE\_BAD\_PARAM

On entry, argument *<value>* had an illegal value.

### NE\_INTERNAL\_ERROR

An internal error has occurred in this function. Check the function call and any array sizes. If the call is correct then please contact NAG for assistance.

**NE\_NOT\_APPEND\_FILE**

Cannot open file *<value>* for appending.

**NE\_NOT\_CLOSE\_FILE**

Cannot close file *<value>*.

**NE\_NOT\_WRITE\_FILE**

Cannot open file *<value>* for writing.

**7 Accuracy**

Not applicable.

**8 Parallelism and Performance**

nag\_band\_real\_mat\_print (x04cec) is not threaded in any implementation.

**9 Further Comments**

A call to nag\_band\_real\_mat\_print (x04cec) is equivalent to a call to nag\_band\_real\_mat\_print\_comp (x04cfc) with the following argument values:

```
ncols = 80
indent = 0
labrow = Nag_IntegerLabels
labcol = Nag_IntegerLabels
form = 0
```

**10 Example**

See Section 10 in nag\_dpbtfr (f07hdc).

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