

NAG C 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 real band matrix.

2 Specification

```
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 real 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 Parameters

- 1: **order** – Nag_OrderType *Input*
On entry: the **order** parameter 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 2.2.1.4 of the Essential Introduction for a more detailed explanation of the use of this parameter.
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 sub-diagonals of the band matrix *A*.
Constraint: **kl** ≥ 0.

- 5: **ku** – Integer *Input*
On entry: the number of super-diagonals of the band matrix A .
Constraint: $\mathbf{ku} \geq 0$.
- 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** and at least $\max(1, \mathbf{pda} \times \mathbf{m})$ when **order** = **Nag_RowMajor**.
On entry: the m by n matrix A . This is stored as a notional two-dimensional array with row elements or column elements stored contiguously. The storage of elements a_{ij} , for $i = 1, \dots, m$ and $j = \max(1, i - k_l), \dots, \min(n, i + k_u)$, depends on the **order** parameter as follows:
 if **order** = **Nag_ColMajor**, a_{ij} is stored as $\mathbf{a}[(j - 1) \times \mathbf{pda} + \mathbf{kl} + \mathbf{ku} + i - j]$;
 if **order** = **Nag_RowMajor**, a_{ij} is stored as $\mathbf{a}[(i - 1) \times \mathbf{pda} + \mathbf{kl} + j - i]$.
- 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: $\mathbf{pda} \geq \mathbf{kl} + \mathbf{ku} + 1$.
- 8: **title** – 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** – 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 parameter (see the Essential Introduction).

6 Error Indicators and Warnings

NE_ALLOC_FAIL

Memory allocation failed.

NE_BAD_PARAM

On entry, parameter $\langle \text{value} \rangle$ had an illegal value.

NE_NOT_WRITE_FILE

Cannot open file $\langle \text{value} \rangle$ for writing.

NE_NOT_APPEND_FILE

Cannot open file $\langle \text{value} \rangle$ for appending.

NE_NOT_CLOSE_FILE

Cannot close file $\langle \text{value} \rangle$.

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 consult NAG for assistance.

7 Accuracy

Not applicable.

8 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
```

9 Example

See Section 9 of the document for `nag_dpbtrf` (f07hdc).
