

NAG Library Function Document

nag_pack_real_mat_print (x04ccc)

1 Purpose

nag_pack_real_mat_print (x04ccc) is an easy-to-use function to print a double triangular matrix stored in a packed one-dimensional array.

2 Specification

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

void nag_pack_real_mat_print (Nag_OrderType order, Nag_UploType uplo,
    Nag_DiagType diag, Integer n, const double a[], const char *title,
    const char *outfile, NagError *fail)
```

3 Description

nag_pack_real_mat_print (x04ccc) prints a double triangular matrix stored in packed form. It is an easy-to-use driver for nag_pack_real_mat_print_comp (x04cdc). 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_pack_real_mat_print (x04ccc) 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 3.2.1.3 in the Essential Introduction for a more detailed explanation of the use of this argument.

Constraint: **order** = Nag_RowMajor or Nag_ColMajor.

2: **uplo** – Nag_UploType *Input*

On entry: indicates the type of the matrix to be printed

uplo = Nag_Lower
The matrix is lower triangular

uplo = Nag_Upper
The matrix is upper triangular

Constraint: **uplo** = Nag_Lower or Nag_Upper.

- 3: **diag** – Nag_DiagType *Input*
On entry: indicates whether the diagonal elements of the matrix are to be printed.
diag = Nag_NonRefDiag
 The diagonal elements of the matrix are not referenced and not printed.
diag = Nag_UnitDiag
 The diagonal elements of the matrix are not referenced, but are assumed all to be unity, and are printed as such.
diag = Nag_NonUnitDiag
 The diagonal elements of the matrix are referenced and printed.
Constraint: **diag** = Nag_NonRefDiag, Nag_UnitDiag or Nag_NonUnitDiag.
- 4: **n** – Integer *Input*
On entry: the order of the matrix to be printed.
 If **n** is less than 1, nag_pack_real_mat_print (x04ccc) will exit immediately after printing **title**; no row or column labels are printed.
- 5: **a**[*dim*] – const double *Input*
Note: the dimension, *dim*, of the array **a** must be at least $\max(1, \mathbf{n} \times (\mathbf{n} + 1)/2)$.
On entry: the matrix to be printed. Note that **a** must have space for the diagonal elements of the matrix, even if these are not stored.
 The storage of elements A_{ij} depends on the **order** and **uplo** arguments as follows:
 if **order** = 'Nag_ColMajor' and **uplo** = 'Nag_Upper',
 A_{ij} is stored in $\mathbf{a}[(j - 1) \times j/2 + i - 1]$, for $i \leq j$;
 if **order** = 'Nag_ColMajor' and **uplo** = 'Nag_Lower',
 A_{ij} is stored in $\mathbf{a}[(2n - j) \times (j - 1)/2 + i - 1]$, for $i \geq j$;
 if **order** = 'Nag_RowMajor' and **uplo** = 'Nag_Upper',
 A_{ij} is stored in $\mathbf{a}[(2n - i) \times (i - 1)/2 + j - 1]$, for $i \leq j$;
 if **order** = 'Nag_RowMajor' and **uplo** = 'Nag_Lower',
 A_{ij} is stored in $\mathbf{a}[(i - 1) \times i/2 + j - 1]$, for $i \geq j$.
 If **diag** = 'Nag_UnitDiag', the diagonal elements of A are assumed to be 1, and are not referenced; the same storage scheme is used whether **diag** = 'Nag_NonUnitDiag' or **diag** = 'Nag_UnitDiag'.
- 6: **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.
- 7: **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.
- 8: **fail** – NagError * *Input/Output*
 The NAG error argument (see Section 3.6 in the Essential Introduction).

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

Not applicable.

9 Further Comments

A call to `nag_pack_real_mat_print` (x04ccc) is equivalent to a call to `nag_pack_real_mat_print_comp` (x04cdc) with the following argument values:

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

10 Example

See Section 10 in `nag_sum_sqs_update` (g02btc).
