NAG Library Function Document

nag_gen_real_mat_print (x04cac)

1 Purpose

nag_gen_real_mat_print (x04cac) is an easy-to-use function to print a real matrix.

2 Specification

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

void nag_gen_real_mat_print (Nag_OrderType order, Nag_MatrixType matrix,
                           Nag_DiagType diag, Integer m, Integer n, const double a[],
                           Integer pda, const char *title, const char *outfile, NagError *fail)
```

3 Description

nag_gen_real_mat_print (x04cac) prints a double matrix. It is an easy-to-use driver for
nag_gen_real_mat_print_comp (x04cbc). 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_gen_real_mat_print (x04cac) 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

   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: matrix – Nag_MatrixType

   On entry: indicates the part of the matrix to be printed.

   matrix = Nag_GeneralMatrix
   The whole of the rectangular matrix.

   matrix = Nag_LowerMatrix
   The lower triangle of the matrix, or the lower trapezium if the matrix has more rows than
   columns.
matrix = Nag_UpperMatrix
The upper triangle of the matrix, or the upper trapezium if the matrix has more columns than rows.

Constraint: matrix = Nag_GeneralMatrix, Nag_LowerMatrix or Nag_UpperMatrix.

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.

If matrix = Nag_GeneralMatrix, then diag must be set to Nag_NonUnitDiag.

Constraints:
if matrix ≠ Nag_GeneralMatrix, diag = Nag_NonRefDiag, Nag_UnitDiag or Nag_NonUnitDiag;
if matrix = Nag_GeneralMatrix, diag = Nag_NonUnitDiag.

4: m – Integer
Input
5: n – Integer
Input

On entry: the number of rows and columns of the matrix, respectively, to be printed.
If either m or n is less than 1, nag_gen_real_mat_print (x04cac) will exit immediately after printing title; no row or column labels are printed.

6: a[dim] – const double
Input

Note: the dimension, dim, of the array a must be at least
max(1, pda × n) when order = Nag_ColMajor;
max(1, m × pda) when order = Nag_RowMajor.

The (i,j)th element of the matrix A is stored in
a[(j - 1) × pda + i - 1] when order = Nag_ColMajor;
a[(i - 1) × pda + j - 1] when order = Nag_RowMajor.

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

7: pda – Integer
Input

On entry: the stride separating row or column elements (depending on the value of order) in the array a.

Constraints:
if order = Nag_ColMajor, pda ≥ max(1, m);
if order = Nag_RowMajor, pda ≥ max(1, n).

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 *  
   \textit{Input}
   \textit{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 *  
    \textit{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 \langle value \rangle 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 \langle value \rangle for appending.

NE_NOT_CLOSE_FILE  
Cannot close file \langle value \rangle.

NE_NOT_WRITE_FILE  
Cannot open file \langle value \rangle for writing.

7 Accuracy
Not applicable.

8 Parallelism and Performance
Not applicable.

9 Further Comments
A call to nag_gen_real_mat_print (x04cac) is equivalent to a call to nag_gen_real_mat_print_comp (x04cbc) with the following argument values:

\begin{verbatim}
ncols = 80
indent = 0
labrow = Nag_IntegerLabels
labcol = Nag_IntegerLabels
form = 0
\end{verbatim}

10 Example
See Section 10 in nag_dgeqrf (f08aec).