

Chapter 1

Utilities

1 Scope of the Chapter

This chapter contains details of the various utilities provided by the Library.

2 Available Modules

Module 1.1: `nag_lib_support` — **Library support facilities**

Provides procedures to:

- print details of the implementation of the Library;
- deallocate storage from structures with types defined by the Library.

Module 1.2: `nag_error_handling` — **Error handling**

Provides the following:

- a procedure which controls how errors are to be handled by the Library;
- a derived type to communicate information about error handling between a user's program and the Library.

Module 1.3: `nag_write_mat` — **Formatted output of matrices**

Provides procedures to:

- output a real, complex or integer general matrix;
- output a real or complex triangular matrix that may also constitute the upper or lower triangle of a symmetric or Hermitian matrix;
- output a real or complex square band matrix stored in a packed two-dimensional array.

Module 1.4: `nag_sort` — **Sorting**

Provides procedures for:

- direct and indirect sorting, rearranging and ranking of one-dimensional vectors of numeric and character data;
- direct and indirect sorting, rearranging and ranking of two-dimensional matrices of numeric data;
- ranking of arbitrary data;
- verifying the rank and permutation indices of sorted data.

Module 1.5: `nag_math_constants` — **Mathematical constants**

Provides functions which return:

- an approximate value of π ;
- an approximate value of the Euler constant γ .