Release 4 News

1 New Features of Release 4

This release represents a moderate expansion of NAG *fl*90 (the NAG Fortran 90 Library). It contains a total of 254 generic documented procedures, of which 43 are new. One new chapter has been introduced:

- Chapter 19 — Operations Research

The new areas covered in this release include:

- Matrix inversion
- Sparse matrices
- Sparse non-symmetric linear systems of equations
- Chebyshev series
- Optimization
- Partial differential equations
- Operations research
- Spectral analysis

In addition, more functionality has been added to the existing sorting, quadrature and optimization modules.

2 New Modules and Procedures

Twelve new modules have been introduced. These modules contain 41 new generic documented procedures and define six new Library derived types. For more details, please refer to the relevant module document. The new modules are:

- Module 4.2: `nag_mat_inv` — Matrix Inversion
- Module 4.3: `nag_sparse_mat` — Sparse Matrix Utilities
- Module 5.6: `nag_sparse_prec` — Sparse Matrix Preconditioner Set-up and Solve
- Module 5.7: `nag_sparse_lin_sys` — Sparse Linear System Iterative Solvers
- Module 8.5: `nag_cheb_1d` — Chebyshev Series
- Module 9.5: `nag_uv_min` — Univariate Minimization
- Module 9.6: `nag_nlp_sparse` — Sparse Nonlinear Programming
- Module 13.2: `nag_pde_ell_mg` — Multigrid Solution of Elliptic Partial Differential Equations
- Module 13.3: `nag_pde_parab_1d` — Parabolic Partial Differential Equations in One Space Variable
- Module 19.1: `nag_ip` — Integer Programming
- Module 19.2: `nag_short_path` — Shortest Path Problems
- Module 29.3: `nag_tsa_spectral` — Time Series Spectral Analysis

The functionality of the following two modules has been extended by introducing two new generic documented procedures.

- Module 9.4: `nag_con_nlin_lsq` — Constrained Nonlinear Least-squares
  `nag_con_nlin_lsq_sol_1` is a procedure to find a constrained minimum of a sum of squares. It is an enhanced version of the procedure `nag_con_nlin_lsq_sol`, which will be withdrawn at a future release.
- Module 11.3: `nag_quad_md` — Multi-dimensional Integrals
  A procedure to evaluate multi-dimensional quadrature over a hyper-rectangle using Monte-Carlo methods.

The interface of the following two procedures has been extended:

- `nag_deallocate` (1.1)
  To allow the deallocation of storage from structures with types introduced at this release.
- `nag_reorder_vec` (1.4)
  To allow the reordering of complex vectors.