Release 3 News

1 New Features of Release 3

This release represents a moderate expansion of NAG *fl*90 (the NAG Fortran 90 Library). It contains a total of 211 documented procedures, of which 23 are new. Two new chapters have been introduced:

- Chapter 4 — Matrix and Vector Operations
- Chapter 28 — Multivariate Analysis

The new areas covered in this release include:

- Kelvin functions
- Norms of a matrix
- Determinant of a matrix
- 3-d FFT
- Constrained nonlinear least-squares
- 2-d quadrature
- Numerical integration utilities
- Multivariate analysis

In addition, more functionality has been added to the existing Bessel function and linear equations modules.

2 New Modules and Procedures

Seven new modules have been introduced. These modules contain 18 new documented procedures and define one new Library derived type. For more details, please refer to the relevant module document. The new modules are:

- Module 3.9: `nag_kelvin_fun` — Kelvin Functions
- Module 4.1: `nag_mat_norm` — Norms of a Matrix
- Module 9.4: `nag_con_nlin_lsq` — Constrained Nonlinear Least-squares
- Module 11.4: `nag_quad_util` — Numerical Integration Utilities
- Module 28.1: `nag_fac_analysis` — Factor Analysis and Principal Component
- Module 28.2: `nag_canon_analysis` — Canonical Analysis
- Module 28.3: `nag_mv_rotation` — Rotations

The functionality of the following four modules has been extended by introducing five new documented procedures.

- Module 5.3: `nag_tri_lin_sys` — Triangular Systems of Linear Equations
  A procedure to evaluate the determinant of a real or complex triangular matrix.
- Module 7.1: `nag_fft` — Discrete Fourier Transforms
  Procedures for 3-d complex discrete Fourier transform, or its inverse.
- Module 11.3: `nag_quad_md` — Multi-dimensional Integrals
  A procedure for finite region 2-d quadrature.
- Module 20.1: `nag_normal_dist` — Probabilities and Deviate for a Normal Distribution
  A procedure to compute probabilities for a multivariate Normal distribution.