

Chapter 7

Transforms

1 Scope of the Chapter

This chapter is concerned with computation of the *discrete Fourier transform* of sequences of real or complex data values, and applying it to calculate convolutions and correlations. All the procedures use some form of the *fast Fourier transform* algorithm.

2 Available Modules

Module 7.1: `nag_fft` — Discrete Fourier transforms

Provides procedures for calculating the discrete Fourier transform of 1-d, 2-d and 3-d sequences. In particular, the module contains procedures for computing:

- the discrete Fourier transform of a single 1-d sequence or multiple 1-d sequences of complex, real or Hermitian data values;
- the discrete Fourier transform of a 2-d complex sequence;
- the discrete Fourier transform of a 3-d complex sequence.

It also provides *four* support procedures for associated tasks.

Module 7.2: `nag_sym_fft` — Symmetric discrete Fourier transforms

Provides procedures for calculating 1-d discrete Fourier transforms of real symmetric sequences. In particular, the module contains procedures for computing the half- and quarter-wave Fourier sine and cosine transforms.

Module 7.3: `nag_conv` — Convolution and correlation

Provides a procedure for computing the discrete convolution or the discrete correlation of two real or complex sequences.