

Chapter 11

Quadrature

1 Scope of the Chapter

This chapter is concerned with the numerical evaluation of definite integrals in one or more dimensions.

2 Available Modules

Module 11.1: `nag_quad_1d` — **One-dimensional integrals on a finite interval**

Provides procedures for computing integrals on a finite interval. In particular, the module contains procedures which compute integrals:

- involving badly behaved integrands, oscillatory integrands and integrands with known points of singularities,
- involving weight functions of trigonometric form,
- involving weight functions with end-point singularities of algebraico-logarithmic type,
- of Cauchy principal type (Hilbert transform),
- of functions defined by data values.

Module 11.2: `nag_quad_1d_inf` — **One-dimensional integrals on an infinite interval**

Provides procedures for computing integrals on an infinite interval. In particular, the module contains procedures which compute integrals:

- of general functions,
- involving weight functions of trigonometric form.

Module 11.3: `nag_quad_md` — **Multi-dimensional integrals**

Provides procedures for computing multi-dimensional integrals. In particular, the module contains procedures which compute:

- integrals of functions defined over a hyper-rectangle,
- multiple integrals of functions defined over a hyper-rectangle,
- two-dimensional integral over a finite region,
- multiple integrals of functions defined over a hyper-rectangle using the Monte-Carlo method.

Module 11.4: `nag_quad_util` — **Utilities for integrals**

Provide a utility procedure for:

- computing the weights (normal or adjusted) and abscissae for different types of Gaussian integration rules.