

## NAG Library Chapter Contents

### D01 – Quadrature

D01 Chapter Introduction – a description of the Chapter and an overview of the algorithms available

Routine Name	Mark of Introduction	Purpose
D01AHF	8	nagf_quad_1d_fin_well One-dimensional quadrature, adaptive, finite interval, strategy due to Patterson, suitable for well-behaved integrands
D01AJF	8	nagf_quad_1d_fin_bad One-dimensional quadrature, adaptive, finite interval, strategy due to Piessens and de Doncker, allowing for badly behaved integrands
D01AKF	8	nagf_quad_1d_fin_osc One-dimensional quadrature, adaptive, finite interval, method suitable for oscillating functions
D01ALF	8	nagf_quad_1d_fin_sing One-dimensional quadrature, adaptive, finite interval, allowing for singularities at user-specified break-points
D01AMF	8	nagf_quad_1d_inf One-dimensional quadrature, adaptive, infinite or semi-infinite interval
D01ANF	8	nagf_quad_1d_fin_wtrig One-dimensional quadrature, adaptive, finite interval, weight function $\cos(\omega x)$ or $\sin(\omega x)$
D01APF	8	nagf_quad_1d_fin_wsing One-dimensional quadrature, adaptive, finite interval, weight function with end-point singularities of algebraico-logarithmic type
D01AQF	8	nagf_quad_1d_fin_wcauchy One-dimensional quadrature, adaptive, finite interval, weight function $1/(x - c)$ , Cauchy principal value (Hilbert transform)
D01ARF	10	nagf_quad_1d_indef One-dimensional quadrature, non-adaptive, finite interval with provision for indefinite integrals
D01ASF	13	nagf_quad_1d_inf_wtrig One-dimensional quadrature, adaptive, semi-infinite interval, weight function $\cos(\omega x)$ or $\sin(\omega x)$
D01ATF	13	nagf_quad_1d_fin_bad_vec One-dimensional quadrature, adaptive, finite interval, variant of D01AJF efficient on vector machines
D01AUF	13	nagf_quad_1d_fin_osc_vec One-dimensional quadrature, adaptive, finite interval, variant of D01AKF efficient on vector machines
D01BCF	8	nagf_quad_1d_gauss_wgen Calculation of weights and abscissae for Gaussian quadrature rules, general choice of rule
D01BDF	8	nagf_quad_1d_fin_smooth One-dimensional quadrature, non-adaptive, finite interval
D01DAF	5	nagf_quad_2d_fin Two-dimensional quadrature, finite region
D01EAF	12	nagf_quad_md_adapt_multi Multidimensional adaptive quadrature over hyper-rectangle, multiple integrands
D01ESF	25	nagf_quad_md_sgq_multi_vec Multi-dimensional quadrature using sparse grids

D01FBF	8	nagf_quad_md_gauss Multidimensional Gaussian quadrature over hyper-rectangle
D01FCF	8	nagf_quad_md_adapt Multidimensional adaptive quadrature over hyper-rectangle
D01FDF	10	nagf_quad_md_sphere Multidimensional quadrature, Sag–Szekeres method, general product region or $n$ -sphere
D01GAF	5	nagf_quad_1d_data One-dimensional quadrature, integration of function defined by data values, Gill–Miller method
D01GBF	10	nagf_quad_md_mcarlo Multidimensional quadrature over hyper-rectangle, Monte–Carlo method
D01GCF	10	nagf_quad_md_numth Multidimensional quadrature, general product region, number-theoretic method
D01GDF	14	nagf_quad_md_numth_vec Multidimensional quadrature, general product region, number-theoretic method, variant of D01GCF efficient on vector machines
D01GYF	10	nagf_quad_md_numth_coeff_prime Korobov optimal coefficients for use in D01GCF or D01GDF, when number of points is prime
D01GZF	10	nagf_quad_md_numth_coeff_2prime Korobov optimal coefficients for use in D01GCF or D01GDF, when number of points is product of two primes
D01JAF	10	nagf_quad_md_sphere_bad Multidimensional quadrature over an $n$ -sphere, allowing for badly behaved integrands
D01PAF	10	nagf_quad_md_simplex Multidimensional quadrature over an $n$ -simplex
D01RAF	24	nagf_quad_1d_gen_vec_multi_rcomm One-dimensional quadrature, adaptive, finite interval, multiple integrands, vectorized abscissae, reverse communication
D01RBF	24	nagf_quad_withdraw_1d_gen_vec_multi_diagnostic Diagnostic routine for D01RAF <b>Note:</b> this routine is scheduled for withdrawal at Mark 27, see Advice on Replacement Calls for Withdrawn/Superseded Routines for further information.
D01RCF	24	nagf_quad_1d_gen_vec_multi_dimreq Determine required array dimensions for D01RAF
D01RGF	24	nagf_quad_1d_fin_gonnet_vec One-dimensional quadrature, adaptive, finite interval, strategy due to Gonnet, allowing for badly behaved integrands
D01TBF	24	nagf_quad_1d_gauss_wres Pre-computed weights and abscissae for Gaussian quadrature rules, restricted choice of rule
D01TDF	26	nagf_quad_1d_gauss_wrec Calculation of weights and abscissae for Gaussian quadrature rules, method of Golub and Welsch
D01TEF	26	nagf_quad_1d_gauss_recm Generates recursion coefficients needed by D01TDF to calculate a Gaussian quadrature rule
D01UAF	24	nagf_quad_1d_gauss_vec One-dimensional Gaussian quadrature, choice of weight functions (vectorized)
D01UBF	26	nagf_quad_1d_inf_exp_wt Non-automatic routine to evaluate $\int_0^\infty \exp(-x^2)f(x) dx$

D01ZKF	24	nagf_quad_opt_set Option setting routine
D01ZLF	24	nagf_quad_opt_get Option getting routine

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