

## NAG Library Chapter Contents

### g05 – Random Number Generators

g05 Chapter Introduction – a description of the Chapter and an overview of the algorithms available

Function Name	Mark of Introduction	Purpose
g05kfc	9	nag_rand_init_repeatable Initializes a pseudorandom number generator to give a repeatable sequence
g05kgc	9	nag_rand_init_nonrepeatable Initializes a pseudorandom number generator to give a non-repeatable sequence
g05khc	9	nag_rand_leap_frog Primes a pseudorandom number generator for generating multiple streams using leap-frog
g05kjc	9	nag_rand_skip_ahead Primes a pseudorandom number generator for generating multiple streams using skip-ahead
g05kke	23	nag_rand_skip_ahead_power2 Primes a pseudorandom number generator for generating multiple streams using skip-ahead, skipping ahead a power of 2
g05ncc	9	nag_rand_permute Pseudorandom permutation of an integer vector
g05ndc	9	nag_rand_sample Pseudorandom sample from an integer vector
g05nec	23	nag_rand_sample_unequal Pseudorandom sample, without replacement, unequal weights
g05pdc	9	nag_rand_agarchI Generates a realization of a time series from a GARCH process with asymmetry of the form $(\epsilon_{t-1} + \gamma)^2$
g05pec	9	nag_rand_agarchII Generates a realization of a time series from a GARCH process with asymmetry of the form $( \epsilon_{t-1}  + \gamma\epsilon_{t-1})^2$
g05pfc	9	nag_rand_garchGJR Generates a realization of a time series from an asymmetric GJosten, Jagannathan and Runkle (GJR) GARCH process
g05pgc	9	nag_rand_egarch Generates a realization of a time series from an exponential GARCH (EGARCH) process
g05phc	9	nag_rand_arma Generates a realization of a time series from an ARMA model
g05pjc	9	nag_rand_varma Generates a realization of a multivariate time series from a VARMA model
g05pmc	9	nag_rand_exp_smooth Generates a realization of a time series from an exponential smoothing model
g05pvc	25	nag_rand_kfold_xyw Permutes a matrix, vector, vector triplet into a form suitable for $K$ -fold cross validation
g05pwc	25	nag_rand_subsamp_xyw Permutes a matrix, vector, vector triplet into a form suitable for random sub-sampling validation
g05pxc	9	nag_rand_orthog_matrix Generates a random orthogonal matrix

g05pyc	9	nag_rand_corr_matrix Generates a random correlation matrix
g05pzc	9	nag_rand_2_way_table Generates a random two-way table
g05rcc	9	nag_rand_copula_students_t Generates a matrix of pseudorandom numbers from a Student's <i>t</i> -copula
g05rdc	9	nag_rand_copula_normal Generates a matrix of pseudorandom numbers from a Gaussian copula
g05rec	9	nag_rand_bivariate_copula_clayton Generates a matrix of pseudorandom numbers from a bivariate Clayton/ Cook–Johnson copula
g05rfc	9	nag_rand_bivariate_copula_frank Generates a matrix of pseudorandom numbers from a bivariate Frank copula
g05rgc	9	nag_rand_bivariate_copula_plackett Generates a matrix of pseudorandom numbers from a bivariate Plackett copula
g05rhc	9	nag_rand_copula_clayton Generates a matrix of pseudorandom numbers from a multivariate Clayton/ Cook–Johnson copula
g05rjc	9	nag_rand_copula_frank Generates a matrix of pseudorandom numbers from a multivariate Frank copula
g05rkc	9	nag_rand_copula_gumbel Generates a matrix of pseudorandom numbers from a Gumbel–Hougaard copula
g05ryc	9	nag_rand_matrix_multi_students_t Generates a matrix of pseudorandom numbers from a multivariate Student's <i>t</i> -distribution
g05rzc	9	nag_rand_matrix_multi_normal Generates a matrix of pseudorandom numbers from a multivariate Normal distribution
g05sac	9	nag_rand_basic Generates a vector of pseudorandom numbers from a uniform distribution over (0, 1]
g05sbc	9	nag_rand_beta Generates a vector of pseudorandom numbers from a beta distribution
g05scc	9	nag_rand_cauchy Generates a vector of pseudorandom numbers from a Cauchy distribution
g05sdc	9	nag_rand_chi_sq Generates a vector of pseudorandom numbers from a $\chi^2$ distribution
g05sec	9	nag_rand_dirichlet Generates a vector of pseudorandom numbers from a Dirichlet distribution
g05sfc	9	nag_rand_exp Generates a vector of pseudorandom numbers from an exponential distribution
g05sgc	9	nag_rand_exp_mix Generates a vector of pseudorandom numbers from an exponential mix distribution
g05shc	9	nag_rand_f Generates a vector of pseudorandom numbers from an <i>F</i> -distribution
g05sjc	9	nag_rand_gamma Generates a vector of pseudorandom numbers from a gamma distribution
g05skc	9	nag_rand_normal Generates a vector of pseudorandom numbers from a Normal distribution
g05slc	9	nag_rand_logistic Generates a vector of pseudorandom numbers from a logistic distribution

g05smc	9	nag_rand_lognormal Generates a vector of pseudorandom numbers from a log-normal distribution
g05snc	9	nag_rand_students_t Generates a vector of pseudorandom numbers from a Student's $t$ -distribution
g05spc	9	nag_rand_triangular Generates a vector of pseudorandom numbers from a triangular distribution
g05sqc	9	nag_rand_uniform Generates a vector of pseudorandom numbers from a uniform distribution over $[a, b]$
g05src	9	nag_rand_von_mises Generates a vector of pseudorandom numbers from a von Mises distribution
g05ssc	9	nag_rand_weibull Generates a vector of pseudorandom numbers from a Weibull distribution
g05tac	9	nag_rand_binomial Generates a vector of pseudorandom integers from a binomial distribution
g05tbc	9	nag_rand_logical Generates a vector of pseudorandom logical values
g05tcc	9	nag_rand_geom Generates a vector of pseudorandom integers from a geometric distribution
g05tdc	9	nag_rand_gen_discrete Generates a vector of pseudorandom integers from a general discrete distribution
g05tec	9	nag_rand_hypergeometric Generates a vector of pseudorandom integers from a hypergeometric distribution
g05tfc	9	nag_rand_logarithmic Generates a vector of pseudorandom integers from a logarithmic distribution
g05tgc	9	nag_rand_gen_multinomial Generates a vector of pseudorandom integers from a multinomial distribution
g05thc	9	nag_rand_neg_bin Generates a vector of pseudorandom integers from a negative binomial distribution
g05tjc	9	nag_rand_poisson Generates a vector of pseudorandom integers from a Poisson distribution
g05tkc	9	nag_rand_compd_poisson Generates a vector of pseudorandom integers from a Poisson distribution with varying mean
g05tlc	9	nag_rand_discrete_uniform Generates a vector of pseudorandom integers from a uniform distribution
g05xac	24	nag_rand_bb_init Initializes the Brownian bridge generator
g05xbc	24	nag_rand_bb Generate paths for a free or non-free Wiener process using the Brownian bridge algorithm
g05xcc	24	nag_rand_bb_inc_init Initializes the generator which backs out the increments of sample paths generated by a Brownian bridge algorithm
g05xdc	24	nag_rand_bb_inc Backs out the increments from sample paths generated by a Brownian bridge algorithm
g05xec	24	nag_rand_bb_make_bridge_order Creates a Brownian bridge construction order out of a set of input times
g05yjc	9	nag_quasi_rand_normal Generates a Normal quasi-random number sequence

g05ykc	9	nag_quasi_rand_lognormal Generates a log-normal quasi-random number sequence
g05ylc	9	nag_quasi_init Initializes a quasi-random number generator
g05ymc	9	nag_quasi_rand_uniform Generates a uniform quasi-random number sequence
g05ync	9	nag_quasi_init_scrambled Initializes a scrambled quasi-random number generator
g05zmc	24	nag_rand_field_1d_user_setup Setup for simulating one-dimensional random fields, user-defined variogram
g05znc	24	nag_rand_field_1d_predef_setup Setup for simulating one-dimensional random fields
g05zpc	24	nag_rand_field_1d_generate Generates realizations of a one-dimensional random field
g05zqc	24	nag_rand_field_2d_user_setup Setup for simulating two-dimensional random fields, user-defined variogram
g05zrc	24	nag_rand_field_2d_predef_setup Setup for simulating two-dimensional random fields, preset variogram
g05zsc	24	nag_rand_field_2d_generate Generates realizations of a two-dimensional random field
g05ztc	24	nag_rand_field_fracbm_generate Generates realizations of fractional Brownian motion

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