NAG Fortran Library Chapter Contents

G05 – Random Number Generators

Note: please refer to the Users' Note for your implementation to check that a routine is available.

G05 Chapter Introduction

Routine Name	Mark of Introduction	Purpose
G05CAF*	6	Pseudo-random real numbers, uniform distribution over (0,1)
G05CBF*	6	Initialize random number generating functions to give repeatable sequence
G05CCF*	6	Initialize random number generating routines to give non-repeatable sequence
G05CFF*	6	Save state of random number generating routines
G05CGF*	6	Restore state of random number generating routines
G05DAF*	6	Pseudo-random real numbers, uniform distribution over (a, b)
G05DBF*	6	Pseudo-random real numbers, (negative) exponential distribution
G05DCF*	6	Pseudo-random real numbers, logistic distribution
G05DDF*	6	Pseudo-random real numbers, Normal distribution
G05DEF*	6	Pseudo-random real numbers, log-normal distribution
G05DFF*	6	Pseudo-random real numbers, Cauchy distribution
G05DHF*	6	Pseudo-random real numbers, χ^2 distribution
G05DJF*	6	Pseudo-random real numbers, Student's t-distribution
G05DKF*	6	Pseudo-random real numbers, F-distribution
G05DPF*	8	Pseudo-random real numbers, Weibull distribution
G05DRF*	15	Pseudo-random integer, Poisson distribution
G05DYF*	6	Pseudo-random integer from uniform distribution
G05DZF*	6	Pseudo-random logical (boolean) value
G05EAF*	10	Set up reference vector for multivariate Normal distribution
G05EBF*	6	Set up reference vector for generating pseudo-random integers, uniform distribution
G05ECF*	6	Set up reference vector for generating pseudo-random integers, Poisson distribution
G05EDF*	6	Set up reference vector for generating pseudo-random integers, binomial distribution
G05EEF*	6	Set up reference vector for generating pseudo-random integers, negative binomial distribution
G05EFF*	6	Set up reference vector for generating pseudo-random integers, hypergeometric distribution
G05EGF*	8	Set up reference vector for univariate ARMA time series model
G05EHF*	10	Pseudo-random permutation of an integer vector
G05EJF*	10	Pseudo-random sample from an integer vector
G05EWF*	8	Generate next term from reference vector for ARMA time series model
G05EXF*	6	Set up reference vector from supplied cumulative distribution function or probability distribution function
G05EYF*	6	Pseudo-random integer from reference vector
G05EZF*	10	Pseudo-random multivariate Normal vector from reference vector
G05FAF*	14	Generates a vector of random numbers from a uniform distribution
G05FBF*	14	Generates a vector of random numbers from an (negative) exponential distribution
G05FDF*	14	Generates a vector of random numbers from a Normal distribution
G05FEF*	15	Generates a vector of pseudo-random numbers from a beta distribution
G05FFF*	15	Generates a vector of pseudo-random numbers from a gamma distribution
G05FSF*	16	Generates a vector of pseudo-random variates from von Mises distribution
G05GAF*	16	Computes a random orthogonal matrix

G05GBF*	16	Computes a random correlation matrix
G05HDF*	15	Generates a realisation of a multivariate time series from a VARMA model
G05HKF	20	Univariate time series, generate n terms of either a symmetric GARCH process or a GARCH process with asymmetry of the form $(\epsilon_{t-1}+\gamma)^2$
G05HLF	20	Univariate time series, generate n terms of a GARCH process with asymmetry of the form $(\lvert\epsilon_{t-1}\rvert+\gamma\epsilon_{t-1})^2$
G05HMF	20	Univariate time series, generate n terms of an asymmetric Glosten, Jagannathan and Runkle (GJR) GARCH process
G05HNF	20	Univariate time series, generate n terms of an exponential GARCH (EGARCH) process
G05KAF	20	Pseudo-random real numbers, uniform distribution over (0,1), seeds and generator number passed explicitly
G05KBF	20	Initialize seeds of a given generator for random number generating routines (that pass seeds explicitly) to give a repeatable sequence
G05KCF	20	Initialize seeds of a given generator for random number generating routines (that pass seeds expicitly) to give non-repeatable sequence
G05KEF	20	Pseudo-random logical (boolean) value, seeds and generator number passed explicitly
G05LAF	20	Generates a vector of random numbers from a Normal distribution, seeds and generator number passed explicitly
G05LBF	20	Generates a vector of random numbers from a Student's t-distribution, seeds and generator number passed explicitly
G05LCF	20	Generates a vector of random numbers from a χ^2 distribution, seeds and generator number passed explicitly
G05LDF	20	Generates a vector of random numbers from an F-distribution, seeds and generator number passed explicitly
G05LEF	20	Generates a vector of random numbers from a β distribution, seeds and generator number passed explicitly
G05LFF	20	Generates a vector of random numbers from a γ distribution, seeds and generator number passed explicitly
G05LGF	20	Generates a vector of random numbers from a uniform distribution, seeds and generator number passed explicitly
G05LHF	20	Generates a vector of random numbers from a triangular distribution, seeds and generator number passed explicitly
G05LJF	20	Generates a vector of random numbers from an exponential distribution, seeds and generator number passed explicitly
G05LKF	20	Generates a vector of random numbers from a lognormal distribution, seeds and generator number passed explicitly
G05LLF	20	Generates a vector of random numbers from a Cauchy distribution, seeds and generator number passed explicitly
G05LMF	20	Generates a vector of random numbers from a Weibull distribution, seeds and generator number passed explicitly
G05LNF	20	Generates a vector of random numbers from a logistic distribution, seeds and generator number passed explicitly
G05LPF	20	Generates a vector of random numbers from a von Mises distribution, seeds and generator number passed explicitly
G05LQF	20	Generates a vector of random numbers from an exponential mixture distribution, seeds and generator number passed explicitly
G05LXF	21	Generates a matrix of random numbers from a multivariate Student's t-distribution, seeds and generator passed explicitly
G05LYF	21	Generates a matrix of random numbers from a multivariate Normal distribution, seeds and generator passed explicitly
G05LZF	20	Generates a vector of random numbers from a multivariate Normal distribution, seeds and generator number passed explicitly
G05MAF	20	Generates a vector of random integers from a uniform distribution, seeds and generator number passed explicitly
G05MBF	20	Generates a vector of random integers from a geometric distribution, seeds and generator number passed explicitly

G05MCF	20	Generates a vector of random integers from a negative binomial distribution, seeds and generator number passed explicitly
G05MDF	20	Generates a vector of random integers from a logarithmic distribution, seeds and generator number passed explicitly
G05MEF	20	Generates a vector of random integers from a Poisson distribution with varying mean, seeds and generator number passed explicitly
G05MJF	20	Generates a vector of random integers from a binomial distribution, seeds and generator number passed explicitly
G05MKF	20	Generates a vector of random integers from a Poisson distribution, seeds and generator number passed explicitly
G05MLF	20	Generates a vector of random integers from a hypergeometric distribution, seeds and generator number passed explicitly
G05MRF	20	Generates a vector of random integers from a multinomial distribution, seeds and generator number passed explicitly
G05MZF	20	Generates a vector of random integers from a general discrete distribution, seeds and generator number passed explicitly
G05NAF	20	Pseudo-random permutation of an integer vector
G05NBF	20	Pseudo-random sample from an integer vector
G05PAF	20	Generates a realisation of a time series from an ARMA model
G05PCF	20	Generates a realisation of a multivariate time series from a VARMA model
G05QAF	20	Computes a random orthogonal matrix
G05QBF	20	Computes a random correlation matrix
G05QDF	20	Generates a random table matrix
G05RAF	21	Generates a matrix of random numbers from a Gaussian Copula, seeds and generator passed explicitly
G05RBF	21	Generates a matrix of random numbers from a Student's *t*-Copula, seeds and generator passed explicitly
G05YAF**	20	Multi-dimensional quasi-random number generator with a uniform probability distribution
G05YBF**	20	Multi-dimensional quasi-random number generator with a Gaussian or log-normal probability distribution
G05YCF	21	Initializes the Faure generator (G05YDF/G05YJF/G05YKF)
G05YDF	21	Generates a sequence of quasi-random numbers using Faure's method
G05YEF	21	Initializes the Sobol generator (G05YFF/G05YJF/G05YKF)
G05YFF	21	Generates a sequence of quasi-random numbers using Sobol's method
G05YGF	21	Initializes the Neiderreiter generator (G05YHF/G05YJF/G05YKF)
G05YHF	21	Generates a sequence of quasi-random numbers using Neiderreiter's method
G05YJF	21	Generates a Normal quasi-random number sequence using Faure's, Sobol's or Neiderreiter's method
G05YKF	21	Generates a log-Normal quasi-random number sequence using Faure's, Sobol's or Neiderreiter's method
G05ZAF*	20	Selects either the basic generator or the Wichmann–Hill generator for those routines using internal communication

* This routine is scheduled for withdrawal at Mark 22. See the document 'Advice on Replacement Calls for Withdrawn/Superseded Routines' for details of the recomended replacement routine.

** This routine has been superseded, although it will be retained in the Library until at least Mark 23. See the document 'Advice on Replacement Calls for Withdrawn/Superseded Routines' for details of the recomended replacement routine.