NAG C Library Function Document

nag_rngs_init_repeatable (g05kbc)

1 Purpose

nag_rngs_init_repeatable (g05kbc) sets the initial seeds for the selected generator as used by and passed to
the group of pseudo-random number functions g05k–g05q.

2 Specification

void nag_rngs_init_repeatable (Integer *igen, Integer iseed[])

3 Description

nag_rngs_init_repeatable (g05kbc) sets the seeds used by the selected generator mechanism (see the g05
Chapter Introduction) to values calculated from the parameter array iseed. The pseudo-random number
generator is selected by the input value of the parameter igen.

For the same value of igen, this function will yield different subsequent sequences of random numbers if
called with different values of iseed, but the sequences, if calculated sequentially, will be repeatable in
different runs of the calling program. It should be noted that there is no guarantee of statistical properties
between sequences, only within sequences.

4 References

None.

5 Parameters

1: igen – Integer *

   Input/Output

   On entry: must contain the identification number for the generator to be used to return a pseudo-
   random number and should remain unchanged until a re-initialisation by a call to one of the
   functions nag_rngs_init_repeatable (g05kbc) or nag_rngs_init_nonrepeatable (g05kcc). The values
   that may be chosen are:

   igen = 0, the basic generator;
   1 ≤ igen ≤ 273, a Wichman–Hill generator.

   See the g05 Chapter Introduction for details.

   On exit: If igen < 0 on input then igen is set to 0, if igen > 273 on input then igen is set to
   mod(igen − 1, 273) + 1.


   Input/Output

   On entry: must contain values which are used to obtain an initial state for the generator selected by
   the parameter igen. The treatment of the array iseed differs depending on the value of igen input.
   As a result, the requirements for meaningful values of the elements of iseed also depend on igen;
   these requirements are as follows:

   if igen = 0, only iseed[0] need be set to any non-negative integer;
   otherwise, all elements of iseed must be set and should be positive and are recommended to
   be at least five digits in length.

   On exit: contains initial seeds for the selected generator.
6 Error Indicators and Warnings
None.

7 Accuracy
Not applicable.

8 Further Comments
None.

9 Example
The example program prints the first five pseudo-random real numbers from a uniform distribution between 0 and 1, generated by nag_rngs_basic (g05kac) after initialisation by nag_rngs_init_repeatable (g05kbc).

9.1 Program Text
/* nag_rngs_init_repeatable(g05kbc) Example Program. */
/* Copyright 2001 Numerical Algorithms Group. */
/* Mark 7, 2001. */

#include <stdio.h>
#include <nag.h>
#include <nag_stdlib.h>
#include <nagg05.h>

int main(void)
{
    /* Scalars */
    double x;
    Integer i, igen;
    Integer exit_status=0;

    /* Arrays */
    Integer iseed[4];

    Vprintf("g05kbc Example Program Results\n\n");

    /* Initialise the seed */
    iseed[0] = 1762543;
    iseed[1] = 9324783;
    iseed[2] = 42344;
    iseed[3] = 742355;
    /* igen identifies the stream. */
    igen = 1;
    g05kbc(&igen, iseed);

    for (i = 1; i <= 5; ++i)
    {
        x = g05kac(igen, iseed);
        Vprintf("%10.4f\n", x);
    }
    return exit_status;
}

9.2 Program Data
None.
9.3 Program Results

g05kbc Example Program Results

0.0893
0.9510
0.4064
0.7432
0.9498