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;

   $1 \leq$ **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 $\mathrm{mod}(\textbf{igen} - 1, 273) + 1$.

2:     **iseed**$[4]$ – Integer   *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
```