NAG Fortran Library Routine Document

G05KBF

Note: before using this routine, please read the Users' Note for your implementation to check the interpretation of ***bold italicised*** terms and other implementation-dependent details.

1 Purpose

G05KBF sets the initial seeds for the selected generator as used by and passed to the group of pseudo-random number routines G05K–G05Q.

2 Specification

```
SUBROUTINE G05KBF(IGEN, ISEED)
INTEGER           IGEN, ISEED(4)
```

3 Description

This routine 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 routine 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*

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 routines G05KBF or G05KCF. 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.

Constraint: $0 \leq$ IGEN ≤ 273.

2: ISEED(4) – INTEGER array *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(1) 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 G05KAF after initialisation by G05KBF.

9.1 Program Text

Note: the listing of the example program presented below uses ***bold italicised*** terms to denote precision-dependent details. Please read the Users' Note for your implementation to check the interpretation of these terms. As explained in the Essential Introduction to this manual, the results produced may not be identical for all implementations.

```
*     G05KBF Example Program Text
*     Mark 20 Release. NAG Copyright 2001.
*     .. Parameters ..
      INTEGER          NOUT
      PARAMETER        (NOUT=6)
*     .. Local Scalars ..
      real             X
      INTEGER          I, IGEN
*     .. Local Arrays ..
      INTEGER          ISEED(4)
*     .. External Functions ..
      real             G05KAF
      EXTERNAL         G05KAF
*     .. External Subroutines ..
      EXTERNAL         G05KBF
*     .. Executable Statements ..
      WRITE (NOUT,*) 'G05KBF Example Program Results'
      WRITE (NOUT,*)
*     Initialise the seed
      ISEED(1) = 1762543
      ISEED(2) = 9324783
      ISEED(3) = 42344
      ISEED(4) = 742355
*     IGEN identifies the stream.
      IGEN = 1
      CALL G05KBF(IGEN,ISEED)
*
      DO 20 I = 1, 5
         X = G05KAF(IGEN,ISEED)
         WRITE (NOUT,99999) X
   20 CONTINUE
      STOP
*
99999 FORMAT (1X,F10.4)
      END
```

9.2 Program Data

None.

9.3 Program Results

```
 G05KBF Example Program Results

     0.0893
     0.9510
     0.4064
     0.7432
     0.9498
```