

NAG 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 pseudorandom number routines G05K–G05Q .

2 Specification

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

3 Description

G05KBF sets the seeds used by the selected generator mechanism (see the G05 Chapter Introduction) to values calculated from the parameter array ISEED. The pseudorandom 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/Output*

On entry: must contain the identification number for the generator to be used to return a pseudorandom number and should remain unchanged until a re-initialization by a call to one of the routines G05KBF or G05KCF. The values that may be chosen are:

IGEN = 0, the basic generator;

$1 \leq \text{IGEN} \leq 273$, 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 $\text{mod}(\text{IGEN} - 1, 273) + 1$.

2: ISEED(4) – INTEGER array *Communication Array*

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

This example prints the first five pseudorandom real numbers from a uniform distribution between 0 and 1, generated by G05KAF after initialization by G05KBF.

9.1 Program Text

```
*      G05KBF Example Program Text
*      Mark 20 Release. NAG Copyright 2001.
*      .. Parameters ..
      INTEGER          NOUT
      PARAMETER        (NOUT=6)
*      .. Local Scalars ..
      DOUBLE PRECISION X
      INTEGER          I, IGEN
*      .. Local Arrays ..
      INTEGER          ISEED(4)
*      .. External Functions ..
      DOUBLE PRECISION G05KAF
      LOGICAL          A00ACF
      EXTERNAL          G05KAF, A00ACF
*      .. External Subroutines ..
      EXTERNAL          G05KBF
*      .. Executable Statements ..
      WRITE (NOUT,*) 'G05KBF Example Program Results'
      WRITE (NOUT,*)
      IF (A00ACF()) THEN
*      Initialize 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
      ELSE
        WRITE (NOUT,*) ' ** No valid licence key was found'
      END IF
*
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
```
