NAG Fortran Library Routine Document

G05CFF

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

G05CFF saves the values of the seeds used by the generator mechanism (see the G05 Chapter Introduction). G05CFF is for use only with the group of routines G05CAF–G05HDF.

2 Specification

```
SUBROUTINE G05CFF(IA, NI, XA, NX, IFAIL)
INTEGER           IA(NI), NI, NX, IFAIL
real              XA(NX)
```

3 Description

This routine saves information about the generator to enable G05CGF subsequently to restore the generator to its current state. The values of NI, NX, IA and XA must not be altered between a call of G05CFF and a call of G05CGF.

4 References

None.

5 Parameters

1: IA(NI) – INTEGER array *Output*

On exit: information about the generator.

2: NI – INTEGER *Input*

On entry: the dimension of the array IA as declared in the (sub)program from which G05CFF is called.

Constraint: NI ≥ 9.

3: XA(NX) – ***real*** array *Output*

On exit: information about the generator.

4: NX – INTEGER *Input*

On entry: the dimension of the array XA as declared in the (sub)program from which G05CFF is called.

Constraint: NX ≥ 4.

5: IFAIL – INTEGER *Input/Output*

On entry: IFAIL must be set to 0, -1 or 1. Users who are unfamiliar with this parameter should refer to Chapter P01 for details.

On exit: IFAIL $= 0$ unless the routine detects an error (see Section 6).

For environments where it might be inappropriate to halt program execution when an error is detected, the value -1 or 1 is recommended. If the output of error messages is undesirable, then the

value 1 is recommended. Otherwise, for users not familiar with this parameter the recommended value is 0. **When the value -1 or 1 is used it is essential to test the value of IFAIL on exit.**

6 Error Indicators and Warnings

If on entry IFAIL $= 0$ or -1, explanatory error messages are output on the current error message unit (as defined by X04AAF).

Errors or warnings detected by the routine:

IFAIL $= 1$

On entry, NI < 9.

IFAIL $= 2$

On entry, NX < 4

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

The example program prints 10 pseudo-random numbers generated by G05CAF; it saves the generator state after the 2nd, and restores it after the 7th so that the 8th, 9th and 10th numbers are the same as the 3rd, 4th and 5th.

The generator mechanism used is selected by an initial call to G05ZAF.

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.

```
*     G05CFF Example Program Text
*     Mark 20 Revised. NAG Copyright 2001.
*     .. Parameters ..
      INTEGER          NOUT
      PARAMETER        (NOUT=6)
*     .. Local Scalars ..
      real             R
      INTEGER          I, IFAIL
*     .. Local Arrays ..
      real             X(5), XA(4)
      INTEGER          IA(9)
*     .. External Functions ..
      real             G05CAF
      EXTERNAL         G05CAF
*     .. External Subroutines ..
      EXTERNAL         G05CBF, G05CFF, G05CGF, G05ZAF
*     .. Executable Statements ..
      CALL G05ZAF('O')
      WRITE (NOUT,*) 'G05CFF Example Program Results'
      WRITE (NOUT,*)
      CALL G05CBF(0)
      IFAIL = 0
      DO 20 I = 1, 5
         X(I) = G05CAF(R)
*
```

```
         IF (I.EQ.2) CALL G05CFF(IA,9,XA,4,IFAIL)
*
   20 CONTINUE
      WRITE (NOUT,99999) (X(I),I=1,5)
      DO 40 I = 1, 5
         X(I) = G05CAF(R)
*
         IF (I.EQ.2) CALL G05CGF(IA,9,XA,4,IFAIL)
*
   40 CONTINUE
      WRITE (NOUT,99999) (X(I),I=1,5)
      STOP
*
99999 FORMAT (1X,5F10.4)
      END
```

9.2 Program Data

None.

9.3 Program Results

```
 G05CFF Example Program Results

     0.7951    0.2257    0.3713    0.2250    0.8787
     0.0475    0.1806    0.3713    0.2250    0.8787
```