

G05DAF – NAG Fortran Library Routine Document

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

G05DAF returns a pseudo-random real number taken from a uniform distribution over the interval $[a, b]$.

2 Specification

```
real FUNCTION G05DAF(A, B)
real           A, B
```

3 Description

This distribution has PDF (probability density function)

$$f(x) = \frac{1}{|a - b|} \quad \text{if } x \in [a, b],$$

$$f(x) = 0 \quad \text{otherwise.}$$

The routine returns the value

$$x = a + (b - a)y$$

where y is a pseudo-random number from a uniform distribution over $(0,1)$, generated by G05CAF. The routine ensures that x lies in the closed interval $[a, b]$.

G05FAF may be used to generate a vector of n pseudo-random numbers which are exactly the same as n successive values of G05DAF. On vector-processing machines G05FAF is likely to be much faster.

4 References

- [1] Knuth D E (1981) *The Art of Computer Programming (Volume 2)* Addison–Wesley (2nd Edition)

5 Parameters

- 1: A — *real* *Input*
 2: B — *real* *Input*

On entry: the end-points a and b of the distribution. It is not necessary that $a < b$.

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 1.0 and 1.5, generated by G05DAF after initialisation by G05CBF.

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.

```

*      G05DAF Example Program Text
*      Mark 14 Revised.  NAG Copyright 1989.
*      .. Parameters ..
      INTEGER          NOUT
      PARAMETER       (NOUT=6)
*      .. Local Scalars ..
      real            X
      INTEGER          I
*      .. External Functions ..
      real            G05DAF
      EXTERNAL         G05DAF
*      .. External Subroutines ..
      EXTERNAL        G05CBF
*      .. Executable Statements ..
      WRITE (NOUT,*) 'G05DAF Example Program Results'
      WRITE (NOUT,*)
      CALL G05CBF(0)
      DO 20 I = 1, 5
*
*          X = G05DAF(1.0e0,1.5e0)
*
*          WRITE (NOUT,99999) X
20  CONTINUE
      STOP
*
99999 FORMAT (1X,F10.4)
      END

```

9.2 Program Data

None.

9.3 Program Results

G05DAF Example Program Results

```

1.3976
1.1129
1.1856
1.1125
1.4394

```