

G05DYF – 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

G05DYF returns a pseudo-random integer taken from a uniform distribution over the interval $[m, n]$.

2 Specification

```
INTEGER FUNCTION G05DYF(M, N)
  INTEGER          M, N
```

3 Description

The distribution of a uniform random variable, I , is given by

$$P(I = i) = \frac{1}{n - m + 1} \quad \text{if } m \leq i \leq n,$$

$$P(I = i) = 0 \quad \text{otherwise,}$$

assuming $m \leq n$. The routine returns the value $m + [(n - m + 1)y]$ where $[]$ denotes the integer part, and y is a pseudo-random number from a uniform distribution over $(0,1)$, generated by G05CAF. If $m > n$, the roles of m and n are reversed.

4 References

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

5 Parameters

- 1: M — INTEGER *Input*
 2: N — INTEGER *Input*

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

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 integers from a uniform distribution between -5 and 5, generated by G05DYF 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.

```

*      G05DYF Example Program Text
*      Mark 14 Revised.  NAG Copyright 1989.
*      .. Parameters ..
          INTEGER          NOUT
          PARAMETER        (NOUT=6)
*      .. Local Scalars ..
          INTEGER          I, IX
*      .. External Functions ..
          INTEGER          G05DYF
          EXTERNAL          G05DYF
*      .. External Subroutines ..
          EXTERNAL          G05CBF
*      .. Executable Statements ..
          WRITE (NOUT,*) 'G05DYF Example Program Results'
          WRITE (NOUT,*)
          CALL G05CBF(0)
          DO 20 I = 1, 5
*
              IX = G05DYF(-5,5)
*
              WRITE (NOUT,99999) IX
          20 CONTINUE
          STOP
*
          99999 FORMAT (1X,I5)
          END

```

9.2 Program Data

None.

9.3 Program Results

G05DYF Example Program Results

```

      3
     -3
     -1
     -3
      4

```
