G05DZF – 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

G05DZF returns a pseudo-random logical value – *true* with probability p and $false$ with probability $(1-p)$.

2 Specification

```
LOGICAL FUNCTION G05DZF(P)
real                    P
```

3 Description

The routine returns the logical value of the relation

$$y < p$$

where y is a pseudo-random number from a uniform distribution over (0,1), generated by G05CAF.

4 References

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

5 Parameters

1: P — ***real*** *Input*

On entry: the parameter p of the distribution (i.e., the probability of a *true* value). If $p < 0$, the value 0 is used; if $p > 1$, the value 1 is used.

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 logical values generated by G05CAF after initialisation by G05CBF, when the probability of a TRUE value is 0.6.

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.

```
*     G05DZF Example Program Text
*     NAG Fortran SMP Library, Release 2.  NAG Copyright 2000.
*     .. Parameters ..
      INTEGER          NOUT
      PARAMETER        (NOUT=6)
*     .. Local Scalars ..
      INTEGER          I
      LOGICAL          X
*     .. External Functions ..
      LOGICAL          G05DZF
      EXTERNAL         G05DZF
*     .. External Subroutines ..
      EXTERNAL         G05CBF, G05ZAF
*     .. Executable Statements ..
      CALL G05ZAF('O')
      WRITE (NOUT,*) 'G05DZF Example Program Results'
      WRITE (NOUT,*)
      CALL G05CBF(0)
      DO 20 I = 1, 5
*
         X = G05DZF(0.6D0)
*
         WRITE (NOUT,99999) X
   20 CONTINUE
      STOP
*
99999 FORMAT (1X,L5)
      END
```

9.2 Program Data

None.

9.3 Program Results

```
 G05DZF Example Program Results

     F
     T
     T
     T
     F
```