

NAG Toolbox for MATLAB

g05ke

1 Purpose

g05ke returns a pseudo-random logical value – *true* with probability p and *false* with probability $(1 - p)$.

2 Syntax

```
[result, iseed, ifail] = g05ke(p, igen, iseed)
```

3 Description

g05ke 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 g05ka using the values of **igen** and **iseed** as input to this function.

One of the initialization functions g05kb (for a repeatable sequence if computed sequentially) or g05kc (for a non-repeatable sequence) must be called prior to the first call to g05ke.

4 References

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

5 Parameters

5.1 Compulsory Input Parameters

1: **p – double scalar**

Must contain the probability of g05ke returning a true result.

Constraint: $0 \leq p \leq 1$.

2: **igen – int32 scalar**

Must contain the identification number for the generator to be used to return a pseudo-random number and should remain unchanged following initialization by a prior call to g05kb or g05kc.

3: **iseed(4) – int32 array**

Contains values which define the current state of the selected generator.

5.2 Optional Input Parameters

None.

5.3 Input Parameters Omitted from the MATLAB Interface

None.

5.4 Output Parameters

1: **result – logical scalar**

The result of the function.

2: **iseed(4) – int32 array**

Contains updated values defining the new state of the selected generator.

3: **ifail – int32 scalar**

0 unless the function detects an error (see Section 6).

6 Error Indicators and Warnings

Errors or warnings detected by the function:

ifail = 1

On entry, **p** < 0,
or **p** > 1.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

```
p = 0.6;
igen = int32(1);
iseed = [int32(1762543);
         int32(9324783);
         int32(42344);
         int32(742355)];
[result, iseedOut, ifail] = g05ke(p, igen, iseed)

result =
     1
iseedOut =
    2299464
     907816
    5377688
    9683645
ifail =
         0
```