

NAG Toolbox for MATLAB

g05ma

1 Purpose

g05ma generates a vector of pseudo-random integers uniformly distributed over the interval $[a, b]$.

2 Syntax

```
[x, iseed, ifail] = g05ma(a, b, n, igen, iseed)
```

3 Description

g05ma generates the next n values y_i from a uniform $(0, 1)$ generator (see g05ka for details) and applies the transformation

$$x_i = a + [(b - a + 1)y_i],$$

where $[z]$ is the integer part of the real value z . The function ensures that the values x_i lie in the closed interval $[a, b]$.

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 g05ma.

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: **a** – int32 scalar

2: **b** – int32 scalar

The end points a and b of the uniform distribution.

Constraint: $a \leq b$.

3: **n** – int32 scalar

n , the number of pseudo-random numbers to be generated.

Constraint: $n \geq 0$.

4: **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.

5: **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: **x(*)** – **int32** array

Note: the dimension of the array **x** must be at least $\max(1, \mathbf{n})$.

The n pseudo-random numbers from the specified uniform distribution.

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, **n** < 0.

ifail = 2

On entry, **b** < **a**.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

```
a = int32(-5);
b = int32(5);
n = int32(5);
igen = int32(1);
iseed = [int32(1762543);
         int32(9324783);
         int32(42344);
         int32(742355)];
[x, iseedOut, ifail] = g05ma(a, b, n, igen, iseed)
```

```
x =
    -5
     5
    -1
     3
     5

iseedOut =
    16516983
    2826895
    4504715
```

```
      8850212  
ifail =  
      0
```
