

NAG Toolbox for MATLAB

g05eb

1 Purpose

g05eb sets up the reference vector, **r**, for a discrete uniform distribution over the interval $[m, n]$.

2 Syntax

```
[r, ifail] = g05eb(m, n, nr)
```

3 Description

g05eb sets up a reference vector for use in g05ey. Together these functions produce random numbers from the distribution defined 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 $m \leq n$. If $m > n$, the roles of m and n are reversed.

The reference array is formed in the natural manner (described in more detail in g05ex).

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: **m** – int32 scalar

2: **n** – int32 scalar

The end points m and n of the distribution. It is not necessary that $m < n$.

3: **nr** – int32 scalar

Suggested value: approximately $5 + 1.4 \times |\mathbf{m} - \mathbf{n}|$ (for optimum efficiency in g05ey).

Constraint: $\mathbf{nr} > |\mathbf{m} - \mathbf{n}| + 3$.

5.2 Optional Input Parameters

None.

5.3 Input Parameters Omitted from the MATLAB Interface

None.

5.4 Output Parameters

1: **r(nr)** – double array

The reference vector **r**.

2: **ifail** – int32 scalar

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

6 Error Indicators and Warnings

Errors detected by the function:

ifail = 1

On entry, **nr** $\leq |\mathbf{m} - \mathbf{n}| + 3$.

7 Accuracy

Not applicable.

8 Further Comments

The time taken by g05eb increases with **nr**.

9 Example

```
m = int32(-5);
n = int32(5);
nr = int32(19);
g05za('O');
g05cb(int32(0));
[r, ifail] = g05eb(m, n, nr)
```

```
r =
    6.0000
   -14.5000
    9.5000
   10.5000
   12.5000
   14.5000
   16.5000
   18.5000
    0.0909
    0.1818
    0.2727
    0.3636
    0.4545
    0.5455
    0.6364
    0.7273
    0.8182
    0.9091
    1.0000
ifail =
      0
```