

nag_random_discrete_uniform (g05dyc)

1. Purpose

nag_random_discrete_uniform (g05dyc) returns a pseudo-random integer taken from a uniform distribution over the interval $[m, n]$.

2. Specification

```
#include <nag.h>
#include <nagg05.h>

Integer nag_random_discrete_uniform(Integer m, Integer n)
```

3. Description

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

$$\begin{aligned} P(I = i) &= \frac{1}{n-m+1} && \text{if } m \leq i \leq n \\ P(I = i) &= 0 && \text{otherwise} \end{aligned}$$

assuming $m \leq n$. The function 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 nag_random_continuous_uniform (g05cac). If $m > n$, the roles of m and n are reversed.

4. Parameters

m

n

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

5. Error Indications and Warnings

None.

6. Further Comments

6.1. References

Knuth D E (1981) *The Art of Computer Programming (Vol 2)* (2nd Edn) Addison-Wesley.

7. See Also

nag_random_continuous_uniform (g05cac)

8. Example

The example program prints the first five pseudo-random integers from a uniform distribution between -5 and 5, generated by nag_random_discrete_uniform after initialisation by nag_random_init_repeatable (g05cbc).

8.1. Program Text

```
/* nag_random_discrete_uniform(g05dyc) Example Program
 *
 * Copyright 1990 Numerical Algorithms Group.
 *
 * Mark 1, 1990.
 */

#include <nag.h>
#include <stdio.h>
#include <nag_stdlib.h>
#include <nagg05.h>

main()
{
    Integer seed = 0;
    Integer five = 5;
    Integer i, ix;

    Vprintf("g05dyc Example Program Results\n");
    g05cbc(seed);
    for (i = 1; i <= 5; ++i)
    {
        ix = g05dyc(-five, five);
        Vprintf("%5ld\n", ix);
    }
    exit(EXIT_SUCCESS);
}
```

8.2. Program Data

None.

8.3. Program Results

```
g05dyc Example Program Results
      3
     -3
     -1
     -3
      4
```
