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

$$P(I = i) = \frac{1}{n-m+1} \quad \text{if} \quad m \leq i \leq n$$
$$P(I = i) = 0 \qquad\qquad \text{otherwise}$$

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
```