

NAG Toolbox for MATLAB

g05dc

1 Purpose

g05dc returns a pseudo-random real number taken from a logistic distribution with mean a and spread b .

2 Syntax

```
[result] = g05dc(a, b)
```

3 Description

The distribution has PDF (probability density function)

$$f(x) = \frac{e^{(x-a)/b}}{b(1 + e^{(x-a)/b})^2}.$$

g05dc returns the value

$$a + b \ln\left(\frac{y}{1-y}\right)$$

where y is a pseudo-random number uniformly distributed over $(0, 1)$, generated by g05ca.

4 References

Kendall M G and Stuart A 1969 *The Advanced Theory of Statistics (Volume 1)* (3rd Edition) Griffin

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

5 Parameters

5.1 Compulsory Input Parameters

1: **a – double scalar**

a , the mean of the distribution.

2: **b – double scalar**

The spread b , of the distribution, where ‘spread’ is $\frac{\sqrt{3}}{\pi} \times$ standard deviation. If **b** is negative, the distribution of the generated numbers – though not the actual sequence – is the same as if the absolute value of **b** were used.

5.2 Optional Input Parameters

None.

5.3 Input Parameters Omitted from the MATLAB Interface

None.

5.4 Output Parameters

1: **result – double scalar**

The result of the function.

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

```
a = 1;  
b = 1.5;  
g05za('O');  
g05cb(int32(0));  
[result] = g05dc(a, b)
```

```
result =  
    3.0341
```