

NAG Toolbox for MATLAB

g05db

1 Purpose

g05db returns a pseudo-random real number taken from a (negative) exponential distribution with mean a .

2 Syntax

```
[result] = g05db(a)
```

3 Description

The distribution has PDF (probability density function)

$$f(x) = \frac{1}{a}e^{-x/a} \quad \text{if } x > 0,$$
$$f(x) = 0 \quad \text{otherwise.}$$

g05db returns the value $-a \ln y$, where y is a pseudo-random number from a uniform distribution over $(0, 1)$, generated by g05ca.

g05fb may be used to generate a vector of n pseudo-random numbers which, if computed sequentially, are exactly the same as n successive values of this function. On many machines g05fb is likely to be much faster.

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**

The parameter a of the distribution. If **a** is negative, its absolute value is 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 = 2;  
g05za('O');  
g05cb(int32(0));  
[result] = g05db(a)
```

```
result =  
    0.4585
```
