

NAG Toolbox for MATLAB

g05de

1 Purpose

g05de returns a pseudo-random real number taken from a log-normal distribution with parameters a and b .

2 Syntax

```
[result] = g05de(a, b)
```

3 Description

The distribution has PDF (probability density function)

$$f(x) = \frac{1}{bx\sqrt{2\pi}} \exp\left(-\frac{(\ln x - a)^2}{2b^2}\right) \quad \text{if } x > 0,$$
$$f(x) = 0 \quad \text{otherwise,}$$

i.e., $\ln x$ is normally distributed with mean a and standard deviation b . g05de returns the value $\exp y$, where y is generated by g05dd from a Normal distribution with mean a and standard deviation b .

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 mean a , of the distribution of $\ln x$.

2: **b** – double scalar

The standard deviation b , of the distribution of $\ln x$. 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] = g05de(a, b)
```

```
result =  
    6.0767
```