

NAG Toolbox for MATLAB

g05dd

1 Purpose

g05dd returns a pseudo-random real number taken from a Normal (Gaussian) distribution with mean a and standard deviation b .

2 Syntax

```
[result] = g05dd(a, b)
```

3 Description

The distribution has PDF (probability density function)

$$f(x) = \frac{1}{b\sqrt{2\pi}} \exp\left(-\frac{(x-a)^2}{2b^2}\right).$$

g05dd uses the method of Brent 1974.

g05fd may be used to generate a vector of n pseudo-random numbers from a Normal distribution, but these are **not** the same as n successive values of this function, because g05fd uses a different method. However on many machines g05fd is likely to be much faster.

4 References

Brent R P 1974 Algorithm 488 *Comm. ACM* 704

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 standard deviation b , of the distribution. 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] = g05dd(a, b)
```

```
result =  
    1.8045
```