NAG Toolbox for MATLAB

g05dp

1 Purpose

g05dp returns a pseudo-random real number taken from a two parameter Weibull distribution with shape parameter a and scale parameter b.

2 Syntax

```
[result, ifail] = g05dp(a, b)
```

3 Description

The distribution has PDF (probability density function)

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

$$f(x) = 0 \quad \text{otherwise.}$$

g05dp returns the value $(-b\ln y)^{1/a}$, where y is a pseudo-random number from a uniform distribution 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 shape parameter of the distribution.

Constraint: **a** > 0.0.

2: **b – double scalar**

b, the scale parameter of the distribution.

Constraint: **b** > 0.0.

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.

2: **ifail – int32 scalar**

0 unless the function detects an error (see Section 6).

6 Error Indicators and Warnings

Errors or warnings detected by the function:

ifail $= 1$

On entry, **a** ≤ 0.0.

ifail $= 2$

On entry, **b** ≤ 0.0.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

```
a = 1;
b = 2;
g05za('O');
g05cb(int32(0));
[result, ifail] = g05dp(a, b)
```

```
result =
    0.4585
ifail =
           0
```