

NAG Toolbox for MATLAB

g01zu

1 Purpose

g01zu is used to initialize functions g01mu and g01eu.

It is intended to be used before a call to g01mu or g01eu.

2 Syntax

```
[xl, xu, work, ifail] = g01zu(rkappa, beta2, mode)
```

3 Description

g01zu initializes the array **work** for use by g01mu or g01eu in the evaluation of the Vavilov functions $\phi_V(\lambda; \kappa, \beta^2)$ and $\Phi_V(\lambda; \kappa, \beta^2)$ respectively.

4 References

Schorr B 1974 Programs for the Landau and the Vavilov distributions and the corresponding random numbers *Comp. Phys. Comm.* **7** 215–224

5 Parameters

5.1 Compulsory Input Parameters

1: **rkappa** – double scalar

The argument κ of the function.

Constraint: $0.01 \leq \mathbf{rkappa} \leq 10.0$.

2: **beta2** – double scalar

The argument β^2 of the function.

Constraint: $0.0 \leq \mathbf{beta2} \leq 1.0$.

3: **mode** – int32 scalar

If **mode** = 0, then g01mu is to be called after the call to g01zu. Otherwise, g01eu is to be called.

5.2 Optional Input Parameters

None.

5.3 Input Parameters Omitted from the MATLAB Interface

None.

5.4 Output Parameters

1: **xl** – double scalar

x_l , a threshold value below which $\phi_V(\lambda; \kappa, \beta^2)$ will be set to zero by g01mu and $\Phi_V(\lambda; \kappa, \beta^2)$ will be set to zero by g01eu if $\lambda > x_l$.

2: **xu – double scalar**

x_u , a threshold value above which $\phi_V(\lambda; \kappa, \beta^2)$ will be set to zero by g01mu and $\Phi_V(\lambda; \kappa, \beta^2)$ will be set to unity by g01eu if $\lambda > x_u$.

3: **work(322) – double array**

This parameter should be passed unchanged to g01eu or g01mu.

4: **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, **rkappa** < 0.01,
or **rkappa** > 10.0,
or **beta2** < 0.0,
or **beta2** > 1.0.

ifail = 2

The initialization has been abandoned due to an internal error. This error exit is unlikely to occur, but if it does change the values of **rkappa** and/or **beta2** and rerun g01zu.

7 Accuracy

At least five significant digits are usually correct.

8 Further Comments

None.

9 Example

```
x = 2.5;
rkappa = 0.4;
beta2 = 0.1;
mode = int32(0);
[xl, xu, work, ifail] = g01zu(rkappa, beta2, mode);
[result, ifail] = g01mu(x, work)

result =
    0.0837
ifail =
    0
```