

NAG Toolbox for MATLAB

g01eu

1 Purpose

g01eu returns the value of the Vavilov distribution function $\Phi_V(\lambda; \kappa, \beta^2)$, via the function name.

It is intended to be used after a call to g01zu.

2 Syntax

```
[result, ifail] = g01eu(x, work)
```

3 Description

g01eu evaluates an approximation to the Vavilov distribution function $\Phi_V(\lambda; \kappa, \beta^2)$ given by

$$\Phi_V(\lambda; \kappa, \beta^2) = \int_{-\infty}^{\lambda} \phi_V(\lambda; \kappa, \beta^2) d\lambda,$$

where $\phi(\lambda)$ is described in g01mu. The method used is based on Fourier expansions. Further details can be found in Schorr 1974.

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: **x – double scalar**

The argument λ of the function.

2: **work(322) – double array**

This **must** be the same parameter **work** as returned by a previous call to g01zu.

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

ifail = 1

Either the initialization function has not been called prior to the first call of this function or a communication array has become corrupted.

7 Accuracy

At least five significant digits are usually correct.

8 Further Comments

g01eu can be called repeatedly with different values of λ provided that the values of κ and β^2 remain unchanged between calls. Otherwise, g01zu must be called again. This is illustrated in Section 9.

9 Example

```
rkappa = 2.5;  
beta2 = 0.7;  
mode = int32(1);  
x = 0.1;  
[xl, xu, work, ifail] = g01zu(rkappa, beta2, mode);  
[result, ifail] = g01eu(x, work)
```

```
result =  
    0.9998  
ifail =  
        0
```