

NAG C Library Function Document

nag_init_vavilov (g01zuc)

1 Purpose

nag_init_vavilov (g01zuc) is used to initialise functions nag_prob_density_vavilov (g01muc) and nag_prob_vavilov (g01euc).

It is intended to be used before a call to nag_prob_density_vavilov (g01muc) or nag_prob_vavilov (g01euc).

2 Specification

```
void nag_init_vavilov (double rkappa, double beta2, Integer mode, double *xl,
    double *xu, double comm_arr[], NagError *fail)
```

3 Description

nag_init_vavilov (g01zuc) initialises the array **comm_arr** for use by nag_prob_density_vavilov (g01muc) or nag_prob_vavilov (g01euc) 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

- 1: **rkappa** – double *Input*
On entry: the argument κ of the function.
Constraint: $0.01 \leq \mathbf{rkappa} \leq 10.0$.
- 2: **beta2** – double *Input*
On entry: the argument β^2 of the function.
Constraint: $0.0 \leq \mathbf{beta2} \leq 1.0$.
- 3: **mode** – Integer *Input*
On entry: if **mode** = 0, then nag_prob_density_vavilov (g01muc) is to be called after the call to nag_init_vavilov (g01zuc). Otherwise, nag_prob_vavilov (g01euc) is to be called.
- 4: **xl** – double * *Output*
On exit: x_l , a threshold value below which $\phi_V(\lambda; \kappa, \beta^2)$ will be set to zero by nag_prob_density_vavilov (g01muc) and $\Phi_V(\lambda; \kappa, \beta^2)$ will be set to zero by nag_prob_vavilov (g01euc) if $\lambda > x_l$.
- 5: **xu** – double * *Output*
On exit: x_u , a threshold value above which $\phi_V(\lambda; \kappa, \beta^2)$ will be set to zero by nag_prob_density_vavilov (g01muc) and $\Phi_V(\lambda; \kappa, \beta^2)$ will be set to unity by nag_prob_vavilov (g01euc) if $\lambda > x_u$.

- 6: **comm_arr**[322] – double *Output*
On exit: this parameter should be passed unchanged to nag_prob_vavilov (g01euc) or nag_prob_density_vavilov (g01muc).
- 7: **fail** – NagError * *Input/Output*
 The NAG error parameter (see the Essential Introduction).

6 Error Indicators and Warnings

NE_REAL

On entry, **beta2** = $\langle value \rangle$.

Constraint: **beta2** ≤ 1.0 .

On entry, **beta2** = $\langle value \rangle$.

Constraint: **beta2** ≥ 0.0 .

On entry, **rkappa** = $\langle value \rangle$.

Constraint: **rkappa** ≤ 10.0 .

On entry, **rkappa** = $\langle value \rangle$.

Constraint: **rkappa** ≥ 0.01 .

NE_BAD_PARAM

On entry, parameter $\langle value \rangle$ had an illegal value.

NE_INTERNAL_ERROR

An internal error has occurred in this function. Check the function call and any array sizes. If the call is correct then please consult NAG for assistance.

7 Accuracy

At least 5 significant digits are usually correct.

8 Further Comments

None.

9 Example

See Section 9 of the documents for nag_prob_density_vavilov (g01muc) and nag_prob_vavilov (g01euc).
