NAG C Library Function Document

nag_cov_to_corr (g02bwc)

1 Purpose

nag_cov_to_corr (g02bwc) calculates a matrix of Pearson product-moment correlation coefficients from sums of squares and cross-products of deviations about the mean.

2 Specification

```
void nag_cov_to_corr (Integer m, double r[], NagError *fail)
```

3 Description

nag_cov_to_corr (g02bwc) calculates a matrix of Pearson product-moment correlation coefficients from sums of squares and cross-products about the mean for observations on m variables which can be computed by a single call to nag_sum_sqs (g02buc) or a series of calls to nag_sum_sqs_update (g02btc). The sums of squares and cross-products are stored in an array packed by column and are overwritten by the correlation coefficients.

Let c_{jk} be the cross-product of deviations from the mean for variables $j = 1, 2, \ldots, m$; $k = j, j+1, \ldots, m$, then the product-moment correlation coefficient, r_{jk} is given by

$$r_{jk} = \frac{c_{jk}}{\sqrt{c_{jj}c_{kk}}}.$$

4 References

None.

5 Parameters

1: **m** – Integer *Input*

On entry: the number, m, of variables.

Constraint: $\mathbf{m} \geq 1$.

2: **r**[dim] – double *Input/Output*

Note: the dimension, dim, of the array **r** must be at least $(\mathbf{m} \times \mathbf{m} + \mathbf{m})/2$.

On entry: **r** contains the upper triangular part of the sums of squares and cross-products matrix of deviations from the mean. These are stored packed by column, i.e., the cross-product between variable j and k, $k \geq j$, is stored in $\mathbf{r}(k \times (k-1)/2 + j)$.

On exit: Pearson product-moment correlation coefficients.

These are stored packed by column corresponding to the input cross-products.

3: **fail** – NagError * *Input/Output*

The NAG error parameter (see the Essential Introduction).

6 Error Indicators and Warnings

NE_INT

On entry, $\mathbf{m} = \langle value \rangle$.
Constraint: $\mathbf{m} \geq 1$.

NE_ZERO_VARIANCE

On entry, a variable has zero variance.

NE_BAD_PARAM

On entry, parameter ⟨*value*⟩ 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

The accuracy of this routine is entirely dependent upon the accuracy of the elements of array **r**.

8 Further Comments

nag_cov_to_corr (g02bwc) may also be used to calculate the correlations between parameter estimates from the variance-covariance matrix of the parameter estimates as is given by several routines in this chapter.

9 Example

None.