Z01CAFP (NUMROC)
NAG Parallel Library Routine Document

Note: Before using this routine, please read the Users' Note for your implementation to check for implementation-dependent details. You are advised to enclose any calls to NAG Parallel Library routines between calls to Z01AAFP and Z01ABFP.

1 Description

Z01CAFP (NUMROC) returns the number of rows (or columns) of a matrix held locally on a given processor when the matrix is distributed in the block scattered distribution described in the Essential Introduction and the the F04 Chapter Introduction, the F07 Chapter Introduction and the F08 Chapter Introduction of the NAG Parallel Library Manual. Z01CAFP (NUMROC) may be called before Z01AAFP. It is a ScaLAPACK function which is described in Section 3.1 of some F07 and F08 routine documents and in [1].

2 Specification

```
INTEGER FUNCTION Z01CAFP(N, MBORNB, IPROC, I1PROC, MPORNP)
ENTRY            NUMROC(N, MBORNB, IPROC, I1PROC, MPORNP)
INTEGER             N, MBORNB, IPROC, I1PROC, MPORNP
```

3 Data Distribution
3.1 Definitions

The following definitions are used in describing the data distribution within this document:

m_p	–	the number of rows in the logical processor grid.
n_p	–	the number of columns in the logical processor grid.
p_r	–	the row grid coordinate of the calling processor.
p_c	–	the column grid coordinate of the calling processor.
M_b	–	the blocking factor for the distribution of the rows of the matrix.
N_b	–	the blocking factor for the distribution of the columns of the matrix.

These definitions are discussed more fully in the Essential Introduction of the NAG Parallel Library Manual.

3.2 Global and Local Arguments

The input argument IPROC is local, so must have different values on different processors. The remaining arguments are global.

4 Arguments

1: N — INTEGER $\hfill$ *Global Input*

On entry: the total number of rows (or columns) of the matrix that are distributed over the logical processor rows (or columns).

Constraint: N $\geq$ 0.

2: MBORNB — INTEGER $\hfill$ *Global Input*

On entry: the blocking factor for the matrix across the rows (or columns).

Constraint: MBORNB $\geq$ 1.

3: IPROC — INTEGER $\hfill$ *Local Input*

On entry: the row (or column) index of the calling processor in the processor grid.

Constraint: 0 $\leq$ IPROC $<$ MPORNP.

4:   I1PROC — INTEGER *Global Input*

On entry: the row (or column) index in the processor grid of the processor holding the first row (or column) of the matrix.

Constraint: $0 \leq$ I1PROC $<$ MPORNP.

5:   MPORNP — INTEGER *Global Input*

On entry: the number of processors in the processor row (or column) over which the matrix is distributed.

Constraint: MPORNP ≥ 1.

5   Errors and Warnings

If an error is detected in any of the arguments, Z01CAFP (NUMROC) returns the value $-i$, where i is the position in the argument list of the first incorrect argument.

6   Further Comments

It is the responsibility of the user to check the value returned by the function and take appropriate action if the result is negative.

7   References

[1]   Choi J, Dongarra J J, Ostrouchov S, Petitet A P, Walker D W and Whaley R C (1994) The Design and Implementation of the ScaLAPACK LU, QR and Cholesky Factorization Routines *LAPACK Working Note 80. Technical Report CS-94-246* Department of Computer Science, University of Tennessee, 107 Ayres Hall, Knoxville, TN 37996-1301, USA