C06GXFP

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

C06GXFP factorizes a positive integer n as $n = n_1 \times n_2$, with $n_1, n_2 \geq 1$ and $n_1 \leq \sqrt{n}$ as close as possible to $\sqrt{n}$.

This routine has been designed for use with C06MCFP, which computes the discrete Fourier transform of a sequence of complex data values of length n.

2 Specification

```
SUBROUTINE C06GXFP(ICNTXT, N, N1, N2, IFAIL)
INTEGER          ICNTXT, N, N1, N2, IFAIL
```

3 Usage

3.1 Definitions

None.

3.2 Global and Local Arguments

The following global **input** arguments must have the same value on entry to the routine on each processor and the global **output** arguments will have the same value on exit from the routine on each processor:

Global input arguments: N, IFAIL

Global output arguments: N1, N2, IFAIL

The remaining argument ICNTXT is local.

3.3 Distribution Strategy

None.

4 Arguments

1:   ICNTXT — INTEGER   *Local Input*

    On entry: the Library context, usually returned by a call to the Library Grid initialisation routine Z01AAFP.

    Note: the value of ICNTXT **must not** be changed.

2:   N — INTEGER   *Global Input*

    On entry: n, the number to be factorized.

    Constraint: N ≥ 1.

3:   N1 — INTEGER   *Global Output*

    On exit: n_1, the first factor of n.

4:   N2 — INTEGER   *Global Output*

    On exit: n_2, the second factor of n.

5: IFAIL — INTEGER *Global Input/Global Output*

On entry: IFAIL must be set to 0, -1 or 1. For users not familiar with this parameter (described in the Essential Introduction) the recommended values are:

IFAIL = 0, if multigridding is **not** employed;
IFAIL = -1, if multigridding is employed.

On exit: IFAIL = 0 unless the routine detects an error (see Section 5).

5   Errors and Warnings

If on entry IFAIL = 0 or -1, explanatory error messages are output from the root processor (or processor {0,0} when the root processor is not available) on the current error message unit (as defined by X04AAF).

5.1   Full Error Checking Mode Only

IFAIL = -2000

The routine has been called with an invalid value of ICNTXT on one or more processors.

IFAIL = -1000

The logical processor grid and library mechanism (Library Grid) have not been correctly defined, see Z01AAFP.

IFAIL = $-i$

On entry, the ith argument was invalid. This error occured either because a global argument did not have the same value on all logical processors, or because its value on one or more processors was incorrect. An explanatory message distinguishes between these two cases.

6   Further Comments

This routine can be used to factorize the length n of the sequence to be transformed by the routine C06MCFP, which computes the discrete Fourier transform of a one-dimensional complex sequence.

7   References

None.

8   Example

See Section 8 of the document for C06MCFP.