NAG Library Routine Document

D02NPF

Note: before using this routine, please read the Users' Note for your implementation to check the interpretation of **bold italicised** terms and other implementation-dependent details.

1 Purpose

D02NPF is a setup routine which you must call prior to D02NEF and after a call to D02MWF, if the Jacobian is to be considered as having a banded structure.

2 Specification

```
SUBROUTINE D02NPF (NEQ, ML, MU, ICOM, LICOM, IFAIL)

INTEGER NEQ, ML, MU, ICOM(LICOM), LICOM, IFAIL
```

3 Description

A call to D02NPF specifies that the Jacobian to be used is banded in structure. If D02NPF is not called before a call to D02NEF then the Jacobian is assumed to be full.

4 References

None.

5 Parameters

1: NEQ – INTEGER   Input

   On entry: the number of differential-algebraic equations to be solved.

   Constraint: $1 \leq$ NEQ.

2: ML – INTEGER   Input

   On entry: m_L, the number of subdiagonals in the band.

   Constraint: $0 \leq$ ML $\leq$ NEQ $- 1$.

3: MU – INTEGER   Input

   On entry: m_U, the number of superdiagonals in the band.

   Constraint: $0 \leq$ MU $\leq$ NEQ $- 1$.

4: ICOM(LICOM) – INTEGER array   *Communication Array*

   ICOM is used to communicate details of the integration from D02MWF and details of the banded structure of the Jacobian to D02NEF.

5: LICOM – INTEGER   Input

   On entry: the dimension of the array ICOM as declared in the (sub)program from which D02NPF is called.

   Constraint: LICOM $\geq 50 +$ NEQ.

6:      IFAIL – INTEGER   *Input/Output*

On entry: IFAIL must be set to 0, −1 or 1. If you are unfamiliar with this parameter you should refer to Section 3.3 in the Essential Introduction for details.

For environments where it might be inappropriate to halt program execution when an error is detected, the value −1 or 1 is recommended. If the output of error messages is undesirable, then the value 1 is recommended. Otherwise, if you are not familiar with this parameter, the recommended value is 0. **When the value −1 or 1 is used it is essential to test the value of IFAIL on exit.**

On exit: IFAIL = 0 unless the routine detects an error or a warning has been flagged (see Section 6).

6   Error Indicators and Warnings

If on entry IFAIL = 0 or −1, explanatory error messages are output on the current error message unit (as defined by X04AAF).

Errors or warnings detected by the routine:

IFAIL = 1

On entry, $NEQ < 1$.

IFAIL = 2

On entry, $ML < 0$ or $ML > NEQ − 1$.

IFAIL = 3

On entry, $MU < 0$ or $MU > NEQ − 1$.

IFAIL = 4

Either D02MWF has not been called before this call or the communication array ICOM has been corrupted.

IFAIL = 5

On entry, $LICOM < 50 + NEQ$.

7   Accuracy

Not applicable.

8   Further Comments

None.

9   Example

See Section 9 in D02NEF and D02MWF.

_____