

# NAG Library Routine Document

## D02NRF

**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

D02NRF is an enquiry routine for communicating with D02NMF or D02NNF when supplying columns of a sparse Jacobian matrix.

### 2 Specification

```
SUBROUTINE D02NRF (J, IPLACE, INFORM)
INTEGER J, IPLACE, INFORM(23)
```

### 3 Description

D02NRF is required when D02NMF or D02NNF is being used with sparse matrix linear algebra. After an exit from D02NMF or D02NNF with IREVCM = 8, D02NRF must be called to determine which column of the Jacobian is required and where it is to be placed in the array RWORK (a argument of D02NMF or D02NNF).

### 4 References

See the D02M–N Sub-chapter Introduction.

### 5 Arguments

- 1: J – INTEGER *Output*  
*On exit:* the index  $j$  of the column of the Jacobian which is required.
- 2: IPLACE – INTEGER *Output*  
*On exit:* indicates which locations in the array RWORK to fill with the  $j$ th column.  
 If IPLACE = 1, the  $(i, j)$ th element of the Jacobian must be placed in RWORK(50 + 2 × LDYSAV +  $i$ ), otherwise the  $(i, j)$ th element must be placed in RWORK(50 + LDYSAV +  $i$ ).  
 If JCEVAL = 'F', in the previous call to D02NUF, then IPLACE = 2 always, hence the  $j$ th column of the Jacobian must be placed in RWORK(50 + LDYSAV +  $i$ ), for  $i = 1, 2, \dots, \text{NEQ}$ .  
 RWORK, NEQ and LDYSAV are arguments of D02NMF and D02NNF.
- 3: INFORM(23) – INTEGER array *Communication Array*  
*On entry:* contains information supplied by the integrator.

### 6 Error Indicators and Warnings

None.

### 7 Accuracy

Not applicable.

## **8 Parallelism and Performance**

D02NRF is not threaded in any implementation.

## **9 Further Comments**

None.

## **10 Example**

See Section 10 in D02NNF.

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