NAG Fortran Library Routine Document

D02NXF

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

D02NXF is an optional output routine which the user may call, on exit from an integrator in Chapter D02M/N, if sparse matrix linear algebra has been selected.

2 Specification

```
SUBROUTINE D02NXF(ICALL, LIWREQ, LIWUSD, LRWREQ, LRWUSD, NLU, NNZ, NGP,
1                  ISPLIT, IGROW, LBLOCK, NBLOCK, INFORM)
  INTEGER           ICALL, LIWREQ, LIWUSD, LRWREQ, LRWUSD, NLU, NNZ, NGP,
1                   ISPLIT, IGROW, NBLOCK, INFORM(23)
  LOGICAL           LBLOCK
```

3 Description

This routine permits the user to examine the various outputs from the sparse linear algebra routines called by the integrator.

4 References

None.

5 Parameters

1: ICALL – INTEGER *Input*

On entry: indicates whether or not all output parameters have been set during the call to the integrator. If so, that is, if the integrator returned with IFAIL = 0 or 12, then ICALL must be set to 0. Otherwise ICALL must be set to 1, indicating that integration did not take place due to lack of space in arrays WKJAC and JACPVT, and only LIWREQ, LIWUSD, LRWREQ, LRWUSD have been set.

2: LIWREQ – INTEGER *Output*

On exit: the length of the INTEGER workspace JACPVT reserved for the sparse matrix routines.

3: LIWUSD – INTEGER *Output*

On exit: the length of the INTEGER workspace JACPVT actually used by the sparse matrix routines.

4: LRWREQ – INTEGER *Output*

On exit: the length of the **real** workspace WKJAC reserved for the sparse matrix routines.

5: LRWUSD – INTEGER *Output*

On exit: the length of the **real** workspace WKJAC actually used by the sparse matrix routines.

6: NLU – INTEGER *Output*

On exit: the number of LU decompositions done during the integration.

7:   NNZ – INTEGER *Output*

On exit: the number of non-zeros in the Jacobian.

8:   NGP – INTEGER *Output*

On exit: the number of FCN or RESID calls needed to form the Jacobian.

9:   ISPLIT – INTEGER *Output*

On exit: an appropriate value for the parameter ISPLIT when calling D02NUF for subsequent runs of similar problems.

10:   IGROW – INTEGER *Output*

On exit: an estimate of the growth of the elements encountered during the last LU decomposition performed. If the actual estimate exceeds the largest possible integer value for the machine being used (see X02BBF) the IGROW is set to the value returned by X02BBF.

11:   LBLOCK – LOGICAL *Input*

On entry: the value used for the parameter LBLOCK when calling D02NUF.

12:   NBLOCK – INTEGER *Output*

On exit: if LBLOCK = .TRUE., NBLOCK contains the number of diagonal blocks in the Jacobian matrix permuted to block lower triangular form. If NBLOCK = 1 then on subsequent runs of a similar problem LBLOCK should be set to .FALSE. in the call to D02NUF. If LBLOCK = .FALSE., NBLOCK = 1.

13:   INFORM(23) – INTEGER array *Workspace*

This must be the same array as the array INFORM supplied to the integrator. It is used to pass information from the integrator to D02NXF and therefore its contents must not be changed before calling D02NXF.

6   Error Indicators and Warnings

None.

7   Accuracy

Not applicable.

8   Further Comments

The output from this routine, in particular the values of LIWREQ, LIWUSD, LRWREQ, LRWUSD, ISPLIT and IGROW, should be used to determine appropriate values for the parameters of the setup routine D02NUF on further calls to the integrator for the same or similar problems.

9   Example

See Section 9 of the documents for D02NDF, D02NJF and D02NNF.