

NAG Library Routine Document

F06PSF (DSPR2)

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

F06PSF (DSPR2) performs the symmetric rank-2 update operation

$$A \leftarrow \alpha xy^T + \alpha yx^T + A,$$

where A is an n by n real symmetric matrix, stored in packed form, x and y are n element real vectors, and α is a real scalar.

2 Specification

```
SUBROUTINE F06PSF(UPLO, N, ALPHA, X, INCX, Y, INCY, AP)
      INTEGER          N, INCX, INCY
      double precision ALPHA, X(*), Y(*), AP(*)
      CHARACTER*1      UPLO
```

The routine may be called by its BLAS name ***dspr2***.

3 Description

None.

4 References

None.

5 Parameters

- | | | |
|----|---|--------------|
| 1: | UPLO – CHARACTER*1 | <i>Input</i> |
| | <i>On entry:</i> specifies whether the upper or lower triangular part of A is stored. | |
| | UPLO = 'U'
The upper triangular part of A is stored. | |
| | UPLO = 'L'
The lower triangular part of A is stored. | |
| | <i>Constraint:</i> UPLO = 'U' or 'L'. | |
| 2: | N – INTEGER | <i>Input</i> |
| | <i>On entry:</i> n , the order of the matrix A . | |
| | <i>Constraint:</i> $N \geq 0$. | |
| 3: | ALPHA – <i>double precision</i> | <i>Input</i> |
| | <i>On entry:</i> the scalar α . | |
| 4: | X(*) – <i>double precision</i> array | <i>Input</i> |
| | Note: the dimension of the array X must be at least $1 + (N - 1) \text{INCX} $. | |
| | <i>On entry:</i> the incremented array X must contain the n element vector x . | |

- 5: INCX – INTEGER *Input*
On entry: the increment in the subscripts of X between successive elements of x .
Constraint: INCX $\neq$ 0.
- 6: Y(*) – **double precision** array *Input*
Note: the dimension of the array Y must be at least $1 + (N - 1)|\text{INCY}|$.
On entry: the incremented array Y must contain the n element vector y .
- 7: INCY – INTEGER *Input*
On entry: the increment in the subscripts of Y between successive elements of y .
Constraint: INCY $\neq$ 0.
- 8: AP(*) – **double precision** array *Input/Output*
Note: the dimension of the array AP must be at least $N \times (N + 1)/2$.
On entry: the n by n symmetric matrix A , packed by columns.
 More precisely,
 if UPLO = 'U', the upper triangle of A must be stored with element A_{ij} in
 AP($i + j(j - 1)/2$) for $i \leq j$;
 if UPLO = 'L', the lower triangle of A must be stored with element A_{ij} in
 AP($i + (2n - j)(j - 1)/2$) for $i \geq j$.
On exit: the updated matrix A .

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

None.
