

NAG Library Routine Document

F06PQF (DSPR)

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

F06PQF (DSPR) performs the symmetric rank-1 update operation

$$A \leftarrow \alpha x x^T + A,$$

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

2 Specification

```
SUBROUTINE F06PQF(UPLO, N, ALPHA, X, INCX, AP)
      INTEGER          N, INCX
      double precision ALPHA, X(*), AP(*)
      CHARACTER*1      UPLO
```

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

3 Description

None.

4 References

None.

5 Parameters

- | | | |
|----|--|--------------|
| 1: | UPLO – CHARACTER*1
<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'. | <i>Input</i> |
| 2: | N – INTEGER
<i>On entry:</i> n , the order of the matrix A .
<i>Constraint:</i> $N \geq 0$. | <i>Input</i> |
| 3: | ALPHA – <i>double precision</i>
<i>On entry:</i> the scalar α . | <i>Input</i> |
| 4: | X(*) – <i>double precision</i> array
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 . | <i>Input</i> |

5: INCX – INTEGER

Input

On entry: the increment in the subscripts of X between successive elements of x .

Constraint: $\text{INCX} \neq 0$.

6: 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 $\text{AP}(i + j(j - 1)/2)$ for $i \leq j$;

if UPLO = 'L', the lower triangle of A must be stored with element A_{ij} in $\text{AP}(i + (2n - j)(j - 1)/2)$ 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.