

NAG Fortran 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>Input</i> |
| | <i>On entry:</i> specifies whether the upper or lower triangular part of A is stored as follows:
if UPLO = 'U', the upper triangular part of A is stored;
if 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 – double precision | <i>Input</i> |
| | <i>On entry:</i> the scalar α . | |
| 4: | X(*) – double precision array | <i>Input</i> |
| | <i>On entry:</i> the 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: AP(*) – **double precision** array *Input/Output*
Note: the dimension of the array AP must be at least $\max(1, N \times (N + 1)/2)$.
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.
