

NAG Library Routine Document

F06PEF (DSPMV)

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

F06PEF (DSPMV) performs the matrix-vector operation

$$y \leftarrow \alpha Ax + \beta y,$$

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

2 Specification

```
SUBROUTINE F06PEF(UPLO, N, ALPHA, AP, X, INCX, BETA, Y, INCY)
INTEGER          N, INCX, INCY
double precision ALPHA, AP(*), X(*), BETA, Y(*)
CHARACTER*1      UPLO
```

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

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: | AP(*) – <i>double precision</i> array | <i>Input</i> |
| | Note: the dimension of the array AP must be at least $N \times (N + 1)/2$. | |
| | <i>On entry:</i> 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 $i \geq j$.

5: $X(*)$ – *double precision* array *Input*

Note: the dimension of the array X must be at least $1 + (N - 1)|INCX|$.

On entry: the incremented array X must contain the n element vector x .

6: INCX – INTEGER *Input*

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

Constraint: $INCX \neq 0$.

7: BETA – *double precision* *Input*

On entry: the scalar β .

8: $Y(*)$ – *double precision* array *Input/Output*

Note: the dimension of the array Y must be at least $1 + (N - 1)|INCY|$.

On entry: the incremented array Y must contain the n element vector y .

On exit: the updated vector y .

9: INCY – INTEGER *Input*

On entry: the increment in the subscripts of Y between successive elements of y .

Constraint: $INCY \neq 0$.

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

None.
