

NAG Fortran Library Routine Document

F06PDF (DSBMV)

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

F06PDF (DSBMV) performs the matrix-vector operation

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

where A is an n by n real symmetric band matrix with k sub-diagonals and k super-diagonals, x and y are n element real vectors, and α and β are real scalars.

2 Specification

```
SUBROUTINE F06PDF (UPLO, N, K, ALPHA, A, LDA, X, INCX, BETA, Y, INCY)
INTEGER          N, K, LDA, INCX, INCY
double precision ALPHA, A(LDA,*), X(*), BETA, Y(*)
CHARACTER*1     UPLO
```

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

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: | K – INTEGER | <i>Input</i> |
| | <i>On entry:</i> k , the number of sub-diagonals or super-diagonals of the matrix A . | |
| | <i>Constraint:</i> $K \geq 0$. | |
| 4: | ALPHA – <i>double precision</i> | <i>Input</i> |
| | <i>On entry:</i> the scalar α . | |

- 5: A(LDA,*) – **double precision** array *Input*
Note: the second dimension of the array A must be at least $\max(1, N)$.
On entry: the n by n symmetric band matrix A , stored in rows 1 to $k + 1$. More precisely, if UPLO = 'U', the elements of the upper triangle of A within the band must be stored with element a_{ij} in $A(k + 1 + i - j, j)$ for $\max(1, j - k) \leq i \leq j$; if UPLO = 'L', the elements of the lower triangle of A within the band must be stored with element a_{ij} in $A(1 + i - j, j)$ for $j \leq i \leq \min(n, j + k)$.
- 6: LDA – INTEGER *Input*
On entry: the first dimension of the array A as declared in the (sub)program from which F06PDF (DSBMV) is called.
Constraint: $LDA \geq K + 1$.
- 7: X(*) – **double precision** array *Input*
On entry: the vector x .
- 8: INCX – INTEGER *Input*
On entry: the increment in the subscripts of X between successive elements of x .
Constraint: $INCX \neq 0$.
- 9: BETA – **double precision** *Input*
On entry: the scalar β .
- 10: Y(*) – **double precision** array *Input/Output*
On entry: the vector y . If BETA = 0, Y need not be set.
On exit: the updated vector y .
- 11: 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.
