

NAG 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 subdiagonals and k superdiagonals, 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. | |
| | 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: | K – INTEGER | <i>Input</i> |
| | <i>On entry:</i> k , the number of subdiagonals or superdiagonals 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 N .
On entry: the n by n symmetric band matrix A .
The matrix is 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*
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 .
- 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*
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 .
- 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.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

None.
