NAG Library Routine Document

F06YCF (DSYMM)

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

F06YCF (DSYMM) performs one of the matrix-matrix operations

$$C \leftarrow \alpha AB + \beta C \quad \text{or} \quad C \leftarrow \alpha BA + \beta C,$$

where A is a real symmetric matrix, B and C are m by n real matrices, and α and β are real scalars.

2 Specification

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SUBROUTINE F06YCF (SIDE, UPLO, M, N, ALPHA, A, LDA, B, LDB, BETA, C,       &
                   LDC)

INTEGER             M, N, LDA, LDB, LDC
REAL (KIND=nag_wp) ALPHA, A(LDA,*), B(LDB,*), BETA, C(LDC,*)
CHARACTER(1)        SIDE, UPLO
```

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

3 Description

None.

4 References

None.

5 Parameters

1: SIDE – CHARACTER(1) *Input*

On entry: specifies whether B is operated on from the left or the right.

SIDE = 'L'
B is pre-multiplied from the left.

SIDE = 'R'
B is post-multiplied from the right.

Constraint: SIDE = 'L' or 'R'.

2: UPLO – CHARACTER(1) *Input*

On entry: 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.

Constraint: UPLO = 'U' or 'L'.

3: M – INTEGER *Input*

On entry: m, the number of rows of the matrices B and C; the order of A if SIDE = 'L'.

Constraint: M ≥ 0.

4: N – INTEGER *Input*

On entry: n, the number of columns of the matrices B and C; the order of A if SIDE = 'R'.

Constraint: N ≥ 0.

5: ALPHA – REAL (KIND=nag_wp) *Input*

On entry: the scalar α.

6: A(LDA, $*$) – REAL (KIND=nag_wp) array *Input*

Note: the second dimension of the array A must be at least $\max(1, \mathrm{M})$ if SIDE = 'L' and at least $\max(1, \mathrm{N})$ if SIDE = 'R'.

On entry: the symmetric matrix A; A is m by m if SIDE = 'L', or n by n if SIDE = 'R'.

If UPLO = 'U', the upper triangular part of A must be stored and the elements of the array below the diagonal are not referenced.

If UPLO = 'L', the lower triangular part of A must be stored and the elements of the array above the diagonal are not referenced.

7: LDA – INTEGER *Input*

On entry: the first dimension of the array A as declared in the (sub)program from which F06YCF (DSYMM) is called.

Constraints:

if SIDE = 'L', LDA $\geq \max(1, \mathrm{M})$;
if SIDE = 'R', LDA $\geq \max(1, \mathrm{N})$.

8: B(LDB, $*$) – REAL (KIND=nag_wp) array *Input*

Note: the second dimension of the array B must be at least $\max(1, \mathrm{N})$.

On entry: the m by n matrix B.

9: LDB – INTEGER *Input*

On entry: the first dimension of the array B as declared in the (sub)program from which F06YCF (DSYMM) is called.

Constraint: LDB $\geq \max(1, \mathrm{M})$.

10: BETA – REAL (KIND=nag_wp) *Input*

On entry: the scalar β.

11: C(LDC, $*$) – REAL (KIND=nag_wp) array *Input/Output*

Note: the second dimension of the array C must be at least $\max(1, \mathrm{N})$.

On entry: the m by n matrix C.

If BETA = 0, C need not be set.

On exit: the updated matrix C.

12: LDC – INTEGER *Input*

On entry: the first dimension of the array C as declared in the (sub)program from which F06YCF (DSYMM) is called.

Constraint: LDC $\geq \max(1, \mathrm{M})$.

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Parallelism and Performance

Not applicable.

9 Further Comments

None.

10 Example

None.