

NAG Library Routine Document

F06PRF (DSYR2)

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

F06PRF (DSYR2) performs the symmetric rank-2 update operation

$$A \leftarrow \alpha xy^T + \alpha yx^T + A,$$

where A is an n by n real symmetric matrix, x and y are n element real vectors, and α is a real scalar.

2 Specification

```
SUBROUTINE F06PRF(UPLO, N, ALPHA, X, INCX, Y, INCY, A, LDA)
  INTEGER          N, INCX, INCY, LDA
  double precision ALPHA, X(*), Y(*), A(LDA,*)
  CHARACTER*1      UPLO
```

The routine may be called by its BLAS name ***dsyr2***.

3 Description

None.

4 References

None.

5 Parameters

- | | | |
|----|--|--------------|
| 1: | UPLO – CHARACTER*1
<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'. | <i>Input</i> |
| 2: | N – INTEGER
<i>On entry:</i> n , the order of the matrix A .
<i>Constraint:</i> $N \geq 0$. | <i>Input</i> |
| 3: | ALPHA – <i>double precision</i>
<i>On entry:</i> the scalar α . | <i>Input</i> |
| 4: | X(*) – <i>double precision</i> array
Note: the dimension of the array X must be at least $1 + (N - 1) \text{INCX} $.
<i>On entry:</i> the incremented array X must contain the n element vector x . | <i>Input</i> |

- 5: INCX – INTEGER *Input*
On entry: the increment in the subscripts of X between successive elements of x .
Constraint: $\text{INCX} \neq 0$.
- 6: Y(*) – **double precision** array *Input*
Note: the dimension of the array Y must be at least $1 + (N - 1)|\text{INCY}|$.
On entry: the incremented array Y must contain the n element vector y .
- 7: INCY – INTEGER *Input*
On entry: the increment in the subscripts of Y between successive elements of y .
Constraint: $\text{INCY} \neq 0$.
- 8: A(LDA,*) – **double precision** array *Input/Output*
Note: the second dimension of the array A must be at least $\max(1, N)$.
On entry: the n by n symmetric matrix A .
 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.
On exit: the updated matrix A .
- 9: LDA – INTEGER *Input*
On entry: the first dimension of the array A as declared in the (sub)program from which F06PRF (DSYR2) is called.
Constraint: $\text{LDA} \geq \max(1, N)$.

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Further Comments

None.

9 Example

None.