

NAG Fortran 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>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: | ALPHA – double precision | <i>Input</i> |
| | <i>On entry:</i> the scalar α . | |
| 4: | X(*) – double precision array | <i>Input</i> |
| | <i>On entry:</i> the vector x . | |
| 5: | INCX – INTEGER | <i>Input</i> |
| | <i>On entry:</i> the increment in the subscripts of X between successive elements of x .
<i>Constraint:</i> INCX \neq 0. | |

- 6: Y(*) – *double precision* array *Input*
On entry: the 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 triangle of A must be stored and the elements of the array below the diagonal are not referenced; if UPLO = 'L', the lower triangle 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.
