

# NAG Library Routine Document

## F06FKF

**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

F06FKF computes the weighted Euclidean norm of a real vector.

### 2 Specification

```
FUNCTION F06FKF (N, W, INCW, X, INCX)
REAL (KIND=nag_wp) F06FKF
INTEGER          N, INCW, INCX
REAL (KIND=nag_wp) W(*), X(*)
```

### 3 Description

F06FKF returns, via the function name, the weighted Euclidean norm

$$\sqrt{x^T W x}$$

of the  $n$ -element real vector  $x$  scattered with stride INCW and INCX respectively, where  $W = \text{diag}(w)$  and  $w$  is a vector of weights scattered with stride INCW.

### 4 References

None.

### 5 Parameters

- 1: N – INTEGER *Input*  
*On entry:*  $n$ , the number of elements in  $x$ .
- 2: W(\*) – REAL (KIND=nag\_wp) array *Input*  
**Note:** the dimension of the array W must be at least  $\max(1, 1 + (N - 1) \times |\text{INCW}|)$ .  
*On entry:*  $w$ , the vector of weights.  
 If  $\text{INCW} > 0$ ,  $w_i$  must be stored in  $W(1 + (i - 1) \times \text{INCW})$ , for  $i = 1, 2, \dots, N$ .  
 If  $\text{INCW} < 0$ ,  $w_i$  must be stored in  $W(1 - (N - i) \times \text{INCW})$ , for  $i = 1, 2, \dots, N$ .  
*Constraint:* All weights must be non-negative.
- 3: INCW – INTEGER *Input*  
*On entry:* the increment in the subscripts of W between successive elements of  $w$ .
- 4: X(\*) – REAL (KIND=nag\_wp) array *Input*  
**Note:** the dimension of the array X must be at least  $\max(1, 1 + (N - 1) \times |\text{INCX}|)$ .  
*On entry:* the  $n$ -element vector  $x$ .  
 If  $\text{INCX} > 0$ ,  $x_i$  must be stored in  $X(1 + (i - 1) \times \text{INCX})$ , for  $i = 1, 2, \dots, N$ .  
 If  $\text{INCX} < 0$ ,  $x_i$  must be stored in  $X(1 - (N - i) \times \text{INCX})$ , for  $i = 1, 2, \dots, N$ .

Intermediate elements of X are not referenced.

5: INCX – INTEGER

*Input*

*On entry:* the increment in the subscripts of X between successive elements of  $x$ .

## **6 Error Indicators and Warnings**

None.

## **7 Accuracy**

Not applicable.

## **8 Further Comments**

None.

## **9 Example**

None.

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