# 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

$$\sqrt{x^{\mathrm{T}}Wx}$$

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

## 4 References

None.

## 5 Arguments

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 $\max(1, 1 + (\mathrm{N} - 1) \times |\mathrm{INCW}|)$.

*On entry*: $w$, the vector of weights.

If INCW $> 0$, $w_i$ must be stored in W$(1 + (i - 1) \times$ INCX), for $i = 1, 2, \ldots,$ N.

If INCW $< 0$, $w_i$ must be stored in W$(1 - (\mathrm{N} - i) \times$ INCW), for $i = 1, 2, \ldots,$ 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 $\max(1, 1 + (\mathrm{N} - 1) \times |\mathrm{INCX}|)$.

*On entry*: the $n$-element vector $x$.

If INCX $> 0$, $x_i$ must be stored in X$(1 + (i - 1) \times$ INCX), for $i = 1, 2, \ldots,$ N.

If INCX $< 0$, $x_i$ must be stored in X$(1 - (\mathrm{N} - i) \times$ INCX), for $i = 1, 2, \ldots,$ 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 Parallelism and Performance

F06FKF is not threaded in any implementation.

## 9 Further Comments

None.

## 10 Example

None.