

NAG Library Routine Document

F06FUF

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

F06FUF applies a LINPACK (as opposed to NAG) style real elementary reflection to a real vector.

2 Specification

```
SUBROUTINE F06FUF (N, Z, INCZ, Z1, ALPHA, X, INCX)
```

```
INTEGER          N, INCZ, INCX
REAL (KIND=nag_wp) Z(*), Z1, ALPHA, X(*)
```

3 Description

F06FUF applies a real elementary reflection (Householder matrix) P , as generated by F06FSF, to a given real vector:

$$\begin{pmatrix} \alpha \\ x \end{pmatrix} \leftarrow P \begin{pmatrix} \alpha \\ x \end{pmatrix}$$

where x is an n -element real vector and α a real scalar.

4 References

None.

5 Parameters

- | | | |
|----|-----------------------------------------------------------------------------------------------------------------|--------------|
| 1: | N – INTEGER | <i>Input</i> |
| | <i>On entry:</i> n , the number of elements in x and z . | |
| 2: | Z(*) – REAL (KIND=nag_wp) array | <i>Input</i> |
| | Note: the dimension of the array Z must be at least $\max(1, 1 + (N - 1) \times \text{INCZ})$. | |
| | <i>On entry:</i> the vector z , as returned by F06FSF. | |
| | If $\text{INCZ} > 0$, z_i must be stored in $Z(1 + (i - 1) \times \text{INCZ})$, for $i = 1, 2, \dots, N$. | |
| | If $\text{INCZ} < 0$, z_i must be stored in $Z(1 - (N - i) \times \text{INCZ})$, for $i = 1, 2, \dots, N$. | |
| 3: | INCZ – INTEGER | <i>Input</i> |
| | <i>On entry:</i> the increment in the subscripts of Z between successive elements of z . | |
| 4: | Z1 – REAL (KIND=nag_wp) | <i>Input</i> |
| | <i>On entry:</i> the scalar ζ , as returned by F06FSF. | |
| | If $\zeta = 0$, P is assumed to be the unit matrix and the transformation is skipped. | |

- 5: ALPHA – REAL (KIND=nag_wp) *Input/Output*
On entry: the original scalar α .
On exit: the transformed scalar α .
- 6: X(*) – REAL (KIND=nag_wp) array *Input/Output*
Note: the dimension of the array X must be at least $\max(1, 1 + (N - 1) \times |\text{INCX}|)$.
On entry: the original 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 $i = 1, 2, \dots, N$.
On exit: the transformed vector x stored in the same array elements used to supply the original vector x .
- 7: 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.
