

NAG Library Routine Document

F06BPF

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

F06BPF returns an eigenvalue of a 2 by 2 real symmetric matrix.

2 Specification

```
FUNCTION F06BPF (A, B, C)
REAL (KIND=nag_wp) F06BPF
REAL (KIND=nag_wp) A, B, C
```

3 Description

F06BPF returns an eigenvalue of the 2 by 2 real symmetric matrix

$$\begin{pmatrix} a & b \\ b & c \end{pmatrix},$$

via the function name. The result is intended for use as a shift in symmetric eigenvalue routines.

The eigenvalue is computed as

$$c - \frac{b}{f + \operatorname{sign} f \times \sqrt{1 + f^2}},$$

where $f = \frac{a-c}{2b}$.

This is the eigenvalue nearer to c if $a \neq c$, and is equal to $c - b$ if $a = c$.

4 References

None.

5 Arguments

- | | | |
|----|------------------------------------------------------------------------------------------------------------|--------------|
| 1: | A – REAL (KIND=nag_wp)
<i>On entry:</i> the value a , the (1,1) element of the input matrix. | <i>Input</i> |
| 2: | B – REAL (KIND=nag_wp)
<i>On entry:</i> the value b , the (1,2) or (2,1) element of the input matrix. | <i>Input</i> |
| 3: | C – REAL (KIND=nag_wp)
<i>On entry:</i> the value c , the (2,2) element of the input matrix. | <i>Input</i> |

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Parallelism and Performance

F06BPF is not threaded in any implementation.

9 Further Comments

None.

10 Example

None.
