

NAG Library Routine Document

F06BAF

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

F06BAF generates a real Givens plane rotation and the tangent of that rotation.

2 Specification

```
SUBROUTINE F06BAF (A, B, C, S)
REAL (KIND=nag_wp) A, B, C, S
```

3 Description

F06BAF generates a real Givens plane rotation with parameters c (≥ 0) and s , such that, given real a and b :

$$\begin{pmatrix} c & s \\ -s & c \end{pmatrix} \begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} d \\ 0 \end{pmatrix}.$$

On exit, b is overwritten by t , the tangent of the rotation; c and s can be reconstructed from the single stored value t , by a subsequent call to F06BCF.

If $|b| < \sqrt{\epsilon}|a|$, where ϵ is the *machine precision*, the routine sets $c = 1$ and $s = 0$; if $|a| < \sqrt{\epsilon}|b|$, the routine sets $c = 0$ and $s = \text{sign } b/a$.

Note that t is always set to b/a , unless this would overflow, in which case the value $flmax \times \text{sign } b/a$ is returned, where $flmax$ is the value given by 1/(X02AMF).

To apply the plane rotation to a pair of real vectors, call F06EPF (DROT); to apply it to a pair of complex vectors, call F06KPF (ZDROT).

4 References

None.

5 Arguments

- | | | |
|----|--|---------------------|
| 1: | A – REAL (KIND=nag_wp) | <i>Input/Output</i> |
| | <i>On entry:</i> the value a , the first element of the vector which determines the rotation. | |
| | <i>On exit:</i> the value d . | |
| 2: | B – REAL (KIND=nag_wp) | <i>Input/Output</i> |
| | <i>On entry:</i> the value b , the second element of the vector which determines the rotation. | |
| | <i>On exit:</i> the value t , the tangent of the rotation. | |
| 3: | C – REAL (KIND=nag_wp) | <i>Output</i> |
| | <i>On exit:</i> the value c , the cosine of the rotation. | |
| 4: | S – REAL (KIND=nag_wp) | <i>Output</i> |
| | <i>On exit:</i> the value s , the sine of the rotation. | |

6 Error Indicators and Warnings

None.

7 Accuracy

Not applicable.

8 Parallelism and Performance

F06BAF is not threaded in any implementation.

9 Further Comments

None.

10 Example

None.
