NAG Fortran Library Routine Document

F06CBF

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

F06CBF generates a complex Givens plane rotation with parameters c (complex) and s (real), such that, given complex a and b:

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

If b is real, then d is also real. 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 F06CDF.

If $|b| < \epsilon|a|$ and $\operatorname{Im} a = 0$, where ϵ is the ***machine precision***, the routine sets $c = 1$ and $s = |t|$.

If $|b| < \epsilon|a|$ and $\operatorname{Im} a \neq 0$, the routine sets

$$c = \frac{\operatorname{sign}(\operatorname{Re} a)a}{|a|} \quad \text{and} \quad s = |t|$$

Note that t is always set to b/a, unless overflow would occur, in which case the routine returns the value of the expression

```
F06CLF(B,A,FAIL)
```

2 Specification

```
SUBROUTINE F06CBF (A, B, C, S)
double precision      S
complex*16            A, B, C
```

3 Description

None.

4 References

None.

5 Parameters

1: A – ***complex*16*** *Input/Output*

On entry: the value a, the 1st element of the vector which determines the rotation.

On exit: the value d.

2: B – ***complex*16*** *Input/Output*

On entry: the value b, the 2nd element of the vector which determines the rotation.

On exit: the value t, the tangent of the rotation.

3: C – ***complex*16*** *Output*

On exit: the value c, the cosine of the rotation.

4: S – ***double precision*** *Output*

On exit: the value s, the sine of the rotation.

6 Error Indicators and Warnings

None.