

# NAG Library Routine Document

## F06CDF

**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

F06CDF reconstructs the parameters  $c$  (complex) and  $s$  (real) of a complex plane rotation from the tangent of that rotation.

### 2 Specification

```
SUBROUTINE F06CDF (T, C, S)
  REAL (KIND=nag_wp)      S
  COMPLEX (KIND=nag_wp) T, C
```

### 3 Description

F06CDF reconstructs the parameters  $c$  (complex) and  $s$  (real) of a complex plane rotation, from the value of the tangent  $t$ , as returned by F06CBF:

$$c = \frac{\text{sign}(\text{Re}(t))|t|}{t\sqrt{1+|t|^2}}, \quad s = ct.$$

If  $|t| < \sqrt{\epsilon}$ , where  $\epsilon$  is the ***machine precision***, the routine sets:

$$c = \frac{\text{sign}(\text{Re}(t))|t|}{t}, \quad s = \text{sign}(\text{Re}(t))|t|.$$

### 4 References

None.

### 5 Arguments

- |    |   |               |
|----|---|---------------|
| 1: | T – COMPLEX (KIND=nag_wp)                                     | <i>Input</i>  |
|    | <i>On entry:</i> the value $t$ , the tangent of the rotation. |               |
| 2: | C – COMPLEX (KIND=nag_wp)                                     | <i>Output</i> |
|    | <i>On exit:</i> the value $c$ , the cosine of the rotation.   |               |
| 3: | 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

F06CDF is not threaded in any implementation.

## 9 Further Comments

None.

## 10 Example

None.

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