1 SUMMARY

Computes the real and imaginary part of the **Fresnel integral**

$$f(x) = C(x) + iS(x)$$
$$= \frac{1}{2\sqrt{\pi}} \int_0^x \frac{e^{-it}}{\sqrt{t}}\, dt$$

The approximations used are of the form

(a) $0 \le x \le 4$

$$f(x) = e^{-ix} \sum_{n=0}^{11} (a_n + ib_n) \left(\frac{x}{4}\right)^{n+\frac{1}{2}}$$

(b) $x > 4$

$$f(x) = \frac{1-i}{2} + e^{-ix} \sum_{n=0}^{11} (c_n + id_n) \left(\frac{4}{x}\right)^{n+\frac{1}{2}}$$

See J. Boersman, Maths. of Computation, Vol. 14, No. 72, 1960.

ATTRIBUTES — **Version:** 1.0.0. **Types:** `FC10A; FC10AD.` **Original date:** July 1963. **Origin:** S.Marlow, Harwell.

2 HOW TO USE THE PACKAGE

The single precision version

```
CALL FC10A(X,C,S)
```

The double precision version

```
CALL FC10AD(X,C,S)
```

`X` is a `REAL` (`DOUBLE PRECISION` in the D version) variable which must be set by the user to the value of x. **Restriction:** $x \ge 0$, if $x < 0$ then $|x|$ is used in the evaluation.

`C` is a `REAL` (`DOUBLE PRECISION` in the D version) variable which is set by the subroutine to the computed value of $C(x)$ the real part of $f(x)$.

`S` is a `REAL` (`DOUBLE PRECISION` in the D version) variable which is set by the subroutine to the computed value of $S(x)$ the imaginary part of $f(x)$.

3 GENERAL INFORMATION

Use of common: none.

Workspace: none.

Other subroutines: none.

Input/Output: none.

Restrictions:

$x \ge 0$.

Accuracies: 6 figures.