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Fresnel Integrals

Function subprograms RFRSIN, RFRCOS and DFRSIN, DFRCOS calculate the Fresnel integrals

$$S(x) = \int_0^x \frac{\sin t}{\sqrt{t}} dt \qquad (x \geq 0), \qquad S(-x) = -S(x),$$
$$C(x) = \int_0^x \frac{\cos t}{\sqrt{t}} dt \qquad (x \geq 0), \qquad C(-x) = -C(x),$$

for real arguments x.

On CDC and Cray computers, the double-precision versions DFRSIN, DFRCOS are not available.

Structure:

FUNCTION subprograms
User Entry Names: RFRSIN, RFRCOS, DFRSIN, DFRCOS
Obsolete User Entry Names: FRSIN ≡ RFRSIN, FRCOS ≡ RFRCOS

Usage:

In any arithmetic expression,

RFRSIN(X)	or	DFRSIN(X)	has the value	S(X),
RFRCOS(X)	or	DFRCOS(X)	has the value	C(X),

where RFRSIN, RFRCOS are of type REAL, DFRSIN, DFRCOS are of type DOUBLE PRECISION, and X has the same type as the function name.

Method:

Approximation by truncated Chebyshev series.

Accuracy:

RFRSIN and RFRCOS (except on CDC and Cray computers) have full single-precision accuracy. For most values of the argument X, DFRSIN and DFRCOS (and RFRSIN and RFRCOS on CDC and Cray computers) have an accuracy of approximately one significant digit less than the machine precision.

References:

1. Y.L. Luke, The special functions and their approximations, v. II, (Academic Press New York, 1969) 328–329.

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