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Struve Functions of Orders Zero and One

Function subprograms RSTRH0, RSTRH1 and DSTRH0, DSTRH1 calculate the Struve functions

$$\mathbf{H}_n(x) \;=\; (\tfrac{1}{2}x)^{n+1} \sum_{k=0}^{\infty} \frac{(-1)^k (\tfrac{1}{2}x)^{2k}}{\Gamma(k+\tfrac{3}{2})\Gamma(k+n+\tfrac{3}{2})}$$

for real arguments x and $n = 0, 1$.

On CDC and Cray computers, the double-precision versions DSTRH0, DSTRH1 are not available.

Structure:

FUNCTION subprograms
User Entry Names: RSTRH0, RSTRH1, DSTRH0, DSTRH1
Obsolete User Entry Names: STRH0 ≡ RSTRH0, STRH1 ≡ RSTRH1
External References: BESJ0 (C312), DBESJ0 (C312), BESY0 (C312), DBESY0 (C312)

Usage:

In any arithmetic expression,

RSTRH0(X)	or	DSTRH0(X)	has the value	$\mathbf{H}_0$(X),
RSTRH1(X)	or	DSTRH1(X)	has the value	$\mathbf{H}_1$(X),

where RSTRH0, RSTRH1 are of type REAL, DSTRH0, DSTRH1 are of type DOUBLE PRECISION, and X has the same type as the function name.

Method:

Approximation by truncated Chebyshev series.

Accuracy:

RSTRH0 and RSTRH1 (except on CDC and Cray computers) have full single-precision accuracy. For most values of the argument X, DSTRH0, DSTRH1 (and RSTRH0, RSTRH1 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) 370–371.

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