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Value of a Polynomial

Function subprograms RPLNML, DPLNML calculate the value of the polynomial

$$p_n(x) \;=\; a_0 + a_1 x + a_2 x^2 + \cdots + a_n x^n$$

or

$$q_n(x) \;=\; a_0 x^n + a_1 x^{n-1} + a_2 x^{n-2} + \cdots + a_n$$

for real values x, whereas function subprograms CPLNML, WPLNML calculate the value of the polynomial

$$r_n(z) \;=\; c_0 + c_1 z + c_2 z^2 + \cdots + c_n z^n$$

or

$$s_n(x) \;=\; c_0 z^n + c_1 z^{n-1} + c_2 z^{n-2} + \cdots + c_n$$

for complex values z.
On CDC and Cray computers, the double-precision versions DPLNML and WPLNML are not available.

Structure:

FUNCTION subprograms
User Entry Names: RPLNML, DPLNML, CPLNML, WPLNML

Usage:

For t = R (type REAL), t = D (type DOUBLE PRECISION),

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tPLNML(X,N,A,MODE)
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has, in any arithmetic expression, the value $p_n(x)$ or $q_n(x)$;
for t = C (type COMPLEX), t = W (type COMPLEX*16),

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tPLNML(Z,N,C,MODE)
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has, in any arithmetic expression, the value $r_n(z)$ or $s_n(z)$.

X,Z — (type according to t) Arguments x or z, respectively.

N — (INTEGER) Degree n of $p_n(x)$, $q_n(x)$ or $r_n(z)$, $s_n(z)$.

A,C — (type according to t) One-dimensional arrays of dimension (0:d) where d $\geq$ N, containing the coefficients a_k or c_k $(k = 0, \ldots, n)$ in A(k) or C(k), respectively.

MODE — (INTEGER) Either +1 for $p_n(x)$, $r_n(z)$ or -1 for $q_n(x)$, $s_n(z)$.

Method:

The Horner scheme is used.

Notes:

A reference with N $<$ 0 or MODE different from +1 or -1 returns the value zero.
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