PLEM1

PURPOSE
> Compute the real component of the first derivative of the Weierstrass P elliptic function of a complex number (lemniscatic case with unit period parallelogram).

DESCRIPTION
> The Weierstrass elliptic function is described in detail in the Handbook of Mathematical Functions (see REFERENCE section below).

SYNTAX 1
> LET <ar> = PLEM1(<xr>,<xc>)   <SUBSET/EXCEPT/FOR qualification>
> where <xr> is a number, parameter, or variable that specifies the the real component of the input;
>> <xc> is a number, parameter, or variable that specifies the the complex component of the input;
>> <ar> is a variable or a parameter (depending on what <xr> and <xc> are) where the computed values are stored;
> and where the <SUBSET/EXCEPT/FOR qualification> is optional.
>
> This syntax computes the real component.

SYNTAX 2
> LET <ac> = PLEM1I(<xr>,<xc>)   <SUBSET/EXCEPT/FOR qualification>
> where <xr> is a number, parameter, or variable that specifies the the real component of the input;
>> <xc> is a number, parameter, or variable that specifies the the complex component of the input;
>> <ac> is a variable or a parameter (depending on what <xr> and <xc> are) where the computed values are stored;
> and where the <SUBSET/EXCEPT/FOR qualification> is optional.
>
> This syntax computes the complex component.

EXAMPLES
> LET AR = PLEM1(2,1)
> LET AC = PLEM1I(2,1)
> LET AR = PLEM1(X,4)
> LET AC = PLEM1I(X,4)

NOTE 1
> The Weierstrass elliptic functions are computed using algorithm 549 from the ACM Transactions on Mathematical Software (see the REFERENCE section below).

NOTE 2
> If the input value corresponds to a lattice point, an error message is printed and the output value is set to the largest real number on the machine.

DEFAULT
> None

SYNONYMS
> None

RELATED COMMANDS

PEQ	=	Compute the real component of the Weierstrass elliptic function (equianharmonic case).
PEQ1	=	Compute the real component of the first derivative of the Weierstrass elliptic function (equianharmonic case).
PLEM	=	Compute the real component of the Weierstrass elliptic function (lemniscatic case).
SN	=	Compute the Jacobi elliptic function sn.
RF	=	Compute the Carlson elliptic integral of the first kind.
RD	=	Compute the Carlson elliptic integral of the second kind.
ELLIP1	=	Compute the Legendre elliptic integral of the first kind.

REFERENCE
    "Algorithm 549: Weierstrass' Elliptic Functions," Eckhardt, ACM Transactions on Mathematical Software, vol. 6 (pp. 112-120).

    "Handbook of Mathematical Functions, Applied Mathematics Series, Vol. 55," Abramowitz and Stegun, National Bureau of Standards, 1964 (chapter 18).

APPLICATIONS
    Special Functions

IMPLEMENTATION DATE
    94/11

PROGRAM
    X2LABEL DASH = COMPLEX COMPONENT
    TITLE WEIERSTRASS ELLIPTIC FUNCTIONS
    LINE SOLID DASH
    MULTIPLOT 2 2; MULTIPLOT CORNER COORDINATES 0 0 100 100
    LET C = 0.1
    PLOT PLEM1(X,C) FOR X = 0.1 0.01 0.9 AND
    PLOT PLEM1I(X,C) FOR X = 0.1 0.01 0.9
    LET C = -0.1
    PLOT PLEM1(X,C) FOR X = 0.1 0.01 0.9 AND
    PLOT PLEM1I(X,C) FOR X = 0.1 0.01 0.9
    LET C = 0.25
    PLOT PLEM1(X,C) FOR X = 0.1 0.01 0.9 AND
    PLOT PLEM1I(X,C) FOR X = 0.1 0.01 0.9
    LET C = -0.25
    PLOT PLEM1(X,C) FOR X = 0.1 0.01 0.9 AND
    PLOT PLEM1I(X,C) FOR X = 0.1 0.01 0.9
    END OF MULTIPLOT