PEQ

PURPOSE
Compute the real or complex component of the Weierstrass P elliptic function of a complex number (equianharmonic 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> = PEQ(<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 is used to compute the real component.

SYNTAX 2
LET <ac> = PEQI(<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 is used to compute the complex component.

EXAMPLES
LET AR = PEQ(2,1)
LET AC = PEQI(2,1)
LET AR = PEQ(X,4)
LET AC = PEQI(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
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).
PLEM1	=	Compute the real component of the first derivative of the Weierstrass elliptic function (lemniscatic case).
SN	=	Compute the Jacobi elliptic function sn.
RF	=	Compute the Carlson elliptic integral of the first 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

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X1LABEL SOLID = REAL COMPONENT
X2LABEL DASH = COMPLEX COMPONENT
TITLE WEIERSTRASS ELLIPTIC FUNCTIONS
LINE SOLID DASH
MULTIPLOT 2 2; MULTIPLOT CORNER COORDINATES 0 0 100 100
LET C = 0.5
PLOT PEQ(X,C) FOR X = 0 0.01 5 AND
PLOT PEQI(X,C) FOR X = 0 0.01 5
LET C = -0.5
PLOT PEQ(X,C) FOR X = 0 0.01 5 AND
PLOT PEQI(X,C) FOR X = 0 0.01 5
LET C = 10
PLOT PEQ(X,C) FOR X = 0 0.01 5 AND
PLOT PEQI(X,C) FOR X = 0 0.01 5
LET C = -10
PLOT PEQ(X,C) FOR X = 0 0.01 5 AND
PLOT PEQI(X,C) FOR X = 0 0.01 5
END OF MULTIPLOT
```