COMPLEX EXPONENENTIATION

PURPOSE
Carry out a complex exponentiation (element-by-element) of a complex variable.

DESCRIPTION
DATAPLOT stores all variables as reals. Complex variables are supported as a pair of real variables. That is, the pair Y1,Y2 of real variables can be thought of as the single complex variable Y1 + i*Y2 where i is the square root of -1.

Complex exponentiation is defined by the following equation:

\[ e^{a + bi} = (\cos(b)e^a) + (\sin(b)e^a)i \]  

EQ 3-27

SYNTAX
LET <v3> <v4> = COMPLEX EXPONENTIATION <v1> <v2> <SUBSET/EXCEPT/FOR qualification>
where <v1> and <v2> are the real and imaginary components of the input variable;
<v3> and <v4> are the real and imaginary components of the output variable;
and where the <SUBSET/EXCEPT/FOR qualification> is optional and rarely used in this context.

EXAMPLES
LET Y2R Y2I = COMPLEX EXPONENTIATION Y1R Y1I
LET Y3 Y4 = COMPLEX EXPONENT Y1 Y2 SUBSET Y1 > 8

DEFAULT
None

SYNONYMS
None

RELATED COMMANDS
COMPLEX ADDITION = Carries out complex addition.
COMPLEX SUBTRACTION = Carries out complex subtraction.
COMPLEX MULTIPLICATION = Carries out complex multiplication.
COMPLEX DIVISION = Carries out complex division.
COMPLEX SQUARE ROOT = Computes the complex square root.
COMPLEX CONJUGATE = Computes the complex conjugate.
COMPLEX ROOTS = Computes the complex roots.
COMPLEX CONJUGATE = Computes the complex conjugate.

APPLICATIONS
Mathematics

IMPLEMENTATION DATE
87/10

PROGRAM
LET X1 = DATA 1 3 2
LET Y1 = DATA 2 5 2
LET X2 Y2 = COMPLEX EXPONENTIATION X1 Y1
WRITE X1 Y1 X2 Y2