COMPLEX EXPONENTIATION

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:

$$e^{(a+bi)} = (\cos(b)e^a) + (\sin(b)e^a)i \qquad \textbf{(EQ 3-27)}$$

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