

COMPLEX SQUARE ROOT

PURPOSE

Carry out a complex square root (element-by-element) of a complex variable.

DESCRIPTION

DATAPLOT stores all variables as real. 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.

DATAPLOT uses the Fortran intrinsic function CSQRT to calculate the complex square root. This returns the principal (i.e., the root whose real part is positive) square root.

SYNTAX

LET <v3> <v4> = COMPLEX SQUARE ROOT <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 Y3 Y4 = COMPLEX SQUARE ROOT Y1 Y2
```

```
LET Y3 Y4 = COMPLEX SQUARE ROOT Y1 Y2 SUBSET Y1 > 10
```

```
LET Y3 Y4 = COMPLEX SQUARE ROOT Y1 Y2 FOR I = 1 1 20
```

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 EXPONENTIATION	=	Carries out complex exponentiation.
COMPLEX CONJUGATE	=	Computes the complex conjugate.
COMPLEX ROOTS	=	Computes the complex roots.

APPLICATIONS

Mathematics

IMPLEMENTATION DATE

87/10

PROGRAM

```
LET X1 = DATA 1 3 2
```

```
LET Y1 = DATA 2 5 2
```

```
LET X2 Y2 = COMPLEX SQUARE ROOT X1 Y1
```

```
WRITE X1 Y1 X2 Y2
```