

FRACTAL ITERATIONS

PURPOSE

Specify the number of points generated by a FRACTAL PLOT command.

DESCRIPTION

DATAPLOT generates Iterated Function Systems fractals as defined by Michael Barnsley. Barnsley defines an affine transformation as follows:

$$w(x) = w \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} e \\ f \end{bmatrix} \tag{EQ 5-60}$$

Fractal plots are generated by applying one or more affine transformations in an iterative fashion to an initial starting point (DATAPLOT uses (0,0) as the starting point). By default, the iteration is continued until the maximum number of points for a plot is reached (this is 20,000 on the default implementation, but it may be set higher on a given implementation). The number of iterations can be set lower than this maximum, but it cannot be set higher. If you need to generate more points than your current implementation allows, see your local DATAPLOT implementors. See the documentation for the FRACTAL PLOT command for more details on how fractal plots are generated.

SYNTAX

FRACTAL ITERATIONS <val>

where <val> is a positive integer number or parameter that specifies the number of points.

EXAMPLES

FRACTAL ITERATIONS 10000

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

FRACTAL PLOT = Generate a fractal plot.
 FRACTAL TYPE = Specify the format of the input data for the FRACTAL PLOT command.

REFERENCE

“Fractals Everywhere,” Michael Barnsley, Academic Press, 1988.

APPLICATIONS

Fractals

IMPLEMENTATION DATE

93/6

PROGRAM

```
. Generate a fractal fern
READ Y1 TO Y7
180.000 0.160 0.001 180.000 0.000 0.000 1
0.000 0.850 0.850 -2.500 1.600 0.000 15
180.000 0.340 0.300 229.000 1.600 0.000 2
109.709 -0.288 0.379 235.233 0.440 0.000 2
END OF DATA
FRAME OFF; FRAME COORDINATES 5 5 95 95; ANGLE UNITS DEGREES
CHARACTER JUSTIFICATION LEBO; CHARACTER.; LINE BLANK
FRACTAL TYPE WHITHERS
FRACTAL ITERATIONS 10000
FRACTAL PLOT Y1 Y2 Y3 Y4 Y5 Y6 Y7
```