

CANTOR NUMBERS

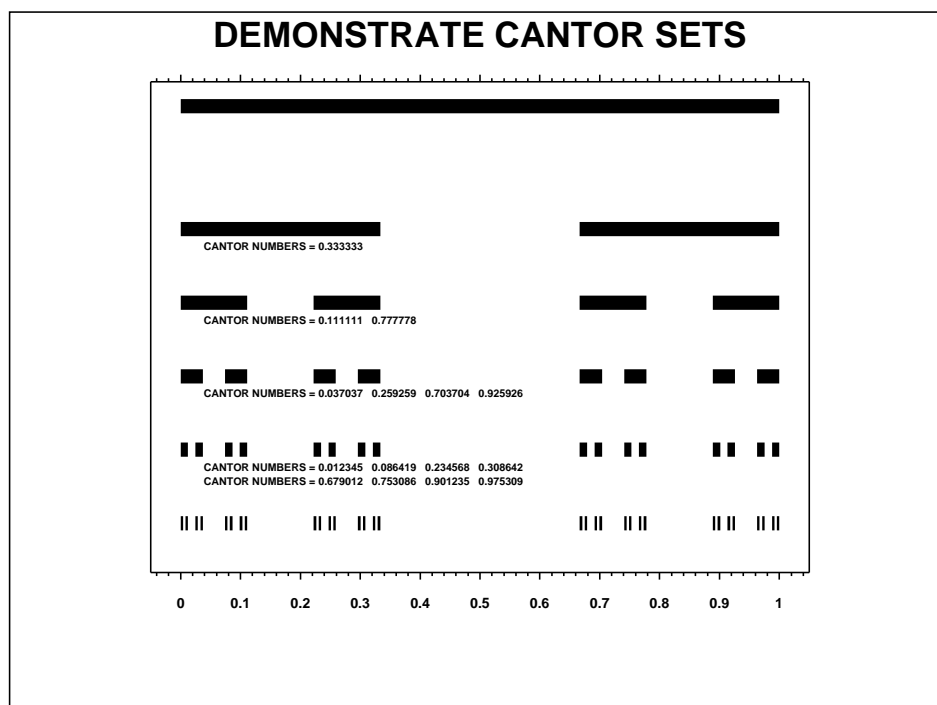
PURPOSE

Generate a sequence of Cantor numbers.

DESCRIPTION

Cantor numbers are derived from Cantor sets. A Cantor set is formed by representing the numbers from 0 to 1 as a line segment. You remove the middle third which leaves 2 line segments. These 2 line segments have their middle third removed which leaves 4 line segments. This procedure can be duplicated an infinite number of times.

The Cantor numbers are the starting points of the removed segments generated at each step (starting points of blank segments created at prior steps are not duplicated). This is demonstrated for the first few iterations with the following plot (borrowed from the Gleick book listed in the REFERENCE below).



SYNTAX

```
LET <resp> = CANTOR NUMBERS FOR I = <start> <inc> <stop>
```

where <resp> is a variable where the Cantor numbers are stored;

<start> is a number or parameter that is the first element of <resp> in which the Cantor numbers are stored (it is almost always 1);

<inc> is a number or parameter that specifies the row increment in <resp> for storing the Cantor numbers (it is almost always 1);

and <stop> is a number or parameter that specifies the last row of <resp> in which to store the Cantor numbers.

EXAMPLES

```
LET YCANT = CANTOR NUMBERS FOR I = 1 1 100
```

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

SEQUENCE = Generate a sequence of numbers.
PATTERN = Generate numbers with a specific pattern.

REFERENCE

“Chaos,” James Gleick, Penguin Press, 1987 (pp. 91-94).

APPLICATIONS

Chaos, fractals

IMPLEMENTATION DATE

89/4

PROGRAM

LET Y = CANTOR NUMBERS FOR I = 1 1 50