

L-Systeme aus Strings

Charwot, Mihola

09.12.2011

Idee

- ◆ Fraktale zeichnen
- ◆ Originell? Nein
- ◆ Anspruchsvoll? Nein
- ◆ Fraktale über Lindenmayer-Systeme zeichnen

Lindenmayer-Systeme

- ◆ Vorschlag des Biologen Aristid Lindenmayer
- ◆ Beschreiben biologische Entwicklungen über Regelsysteme
 - ◆ Alphabet aus Variablen & Konstanten
 - ◆ Ersetzungsregeln
 - ◆ Startwort
- ◆ Zeichnen von Fraktalen: Alphabet → Zeichenoperationen

L-System: Koch-Kurve

- ◆ Variable: F
- ◆ Konstanten: + -
- ◆ Start: F
- ◆ Regel: $(F \rightarrow F+F-F-F+F)$

$n = 0:$

F



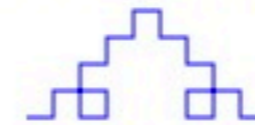
$n = 1:$

F+F-F-F+F



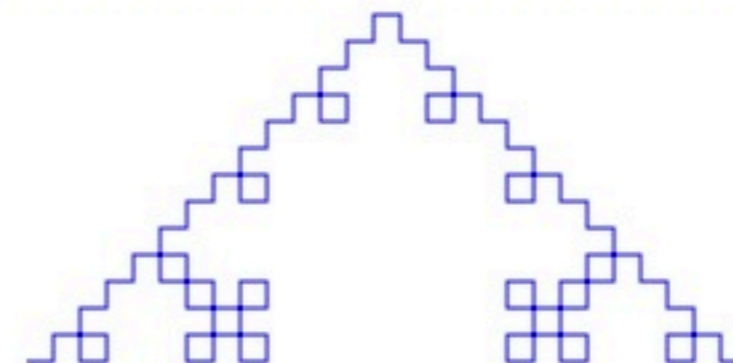
$n = 2:$

F+F-F-F+F + F+F-F-F+F - F+F-F-F+F - F+F-F-F+F + F+F-F-F+F



$n = 3:$

F+F-F-F+F+F+F-F-F+F-F+F-F-F+F-F-F+F-F-F+F-F-F+F +
F+F-F-F+F+F+F-F-F+F-F+F-F-F+F-F-F+F-F-F+F-F-F+F -
F+F-F-F+F+F+F-F-F+F-F+F-F-F+F-F-F+F-F-F+F-F-F+F -
F+F-F-F+F+F+F-F-F+F-F+F-F-F+F-F-F+F-F-F+F-F-F+F +
F+F-F-F+F+F+F-F-F+F-F+F-F-F+F-F-F+F-F-F+F-F-F+F



Idee

◆ Fraktale zeichnen

◆ Originell? Nein

◆ Anspruchsvoll? Nein

◆ Fraktale über Lindenmayer-Systeme zeichnen

◆ Originell? Na-ja

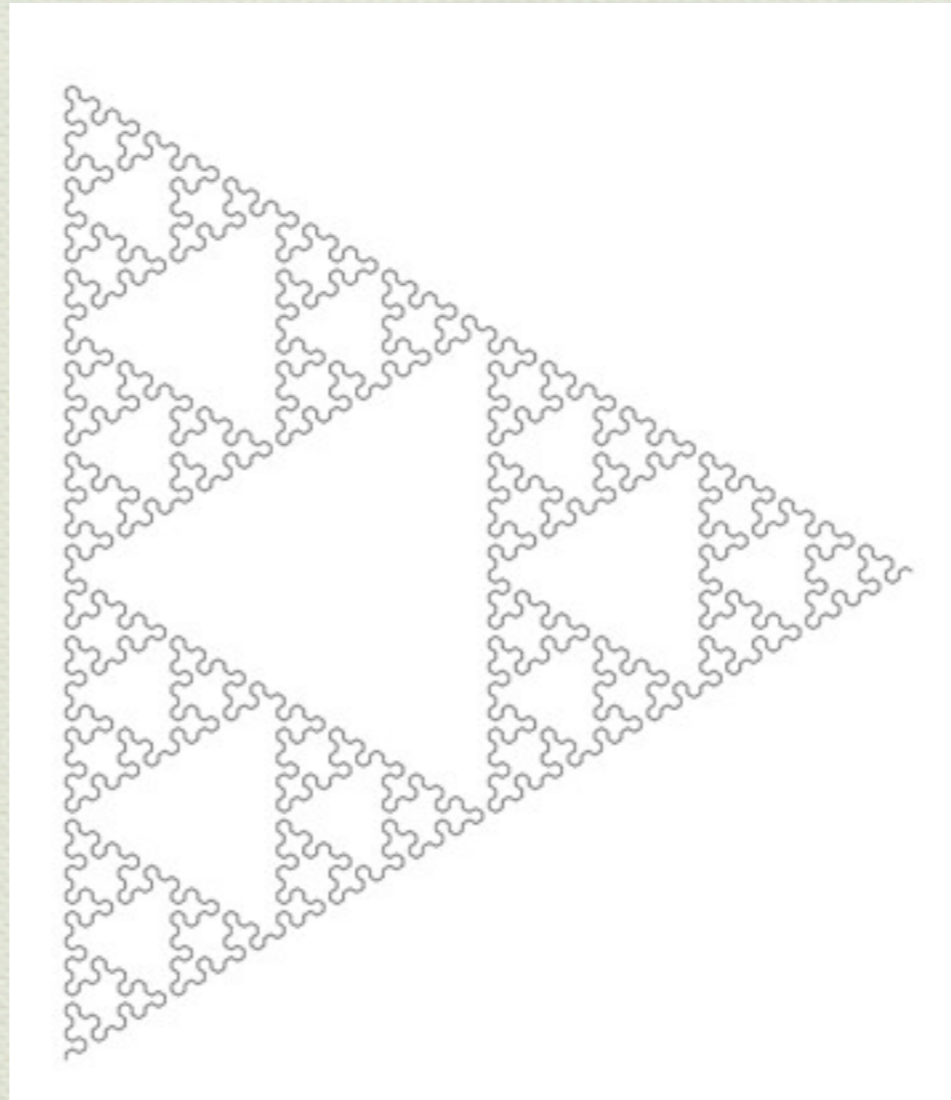
◆ Anspruchsvoll? Na-ja

Zielsetzung

- ◆ Fraktale über Lindenmayer-Systeme zeichnen
 - ◆ Originell? Na-ja
 - ◆ Anspruchsvoll? Na-ja
- ◆ Code direkt aus Regelsystem generieren
 - ◆ Originell? Hoffentlich!
 - ◆ Anspruchsvoll? Deutlich spannender!

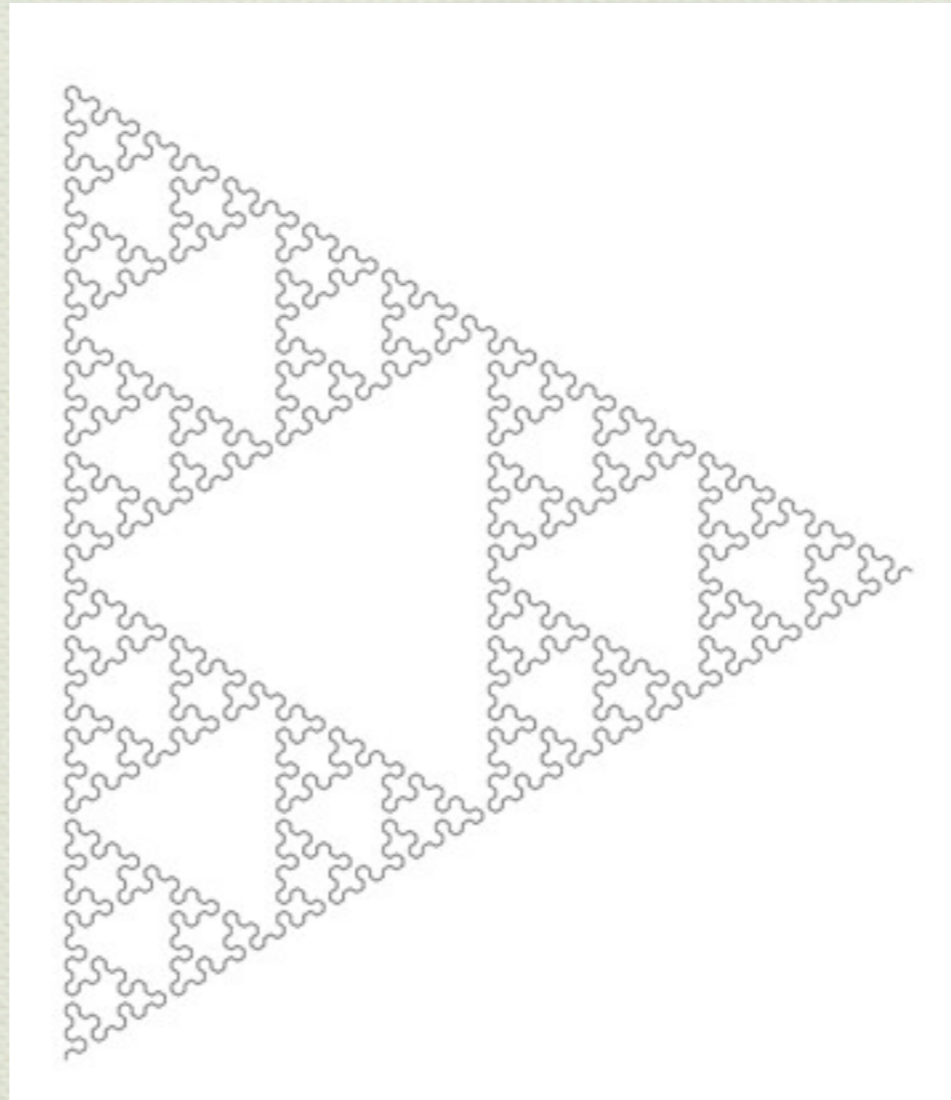
Beispiel

6 60 (A) [[(A) (B-A-B)] [(B) (A+B+A)]] lSystem



Beispiel

6 60 (A) [[(A) (B-A-B)] [(B) (A+B+A)]] lSystem



Code

Vom String zur Prozedur

```
1 /string2proc { % (str) -- {proc}
2     dup
3     /slen exch length def      % slen = length of
        arg string
4     /proc slen array def      % proc = array for
        the procedure statements
5     0 1 slen 1 sub {
6         /i exch def %Define index var
7         dup i 1 getinterval % get next
            character as string
8         proc i insertStrAsCall
9     } for
10    pop                          % drop string
11    proc cvx
12 } def
```


Prozedur implantieren 1

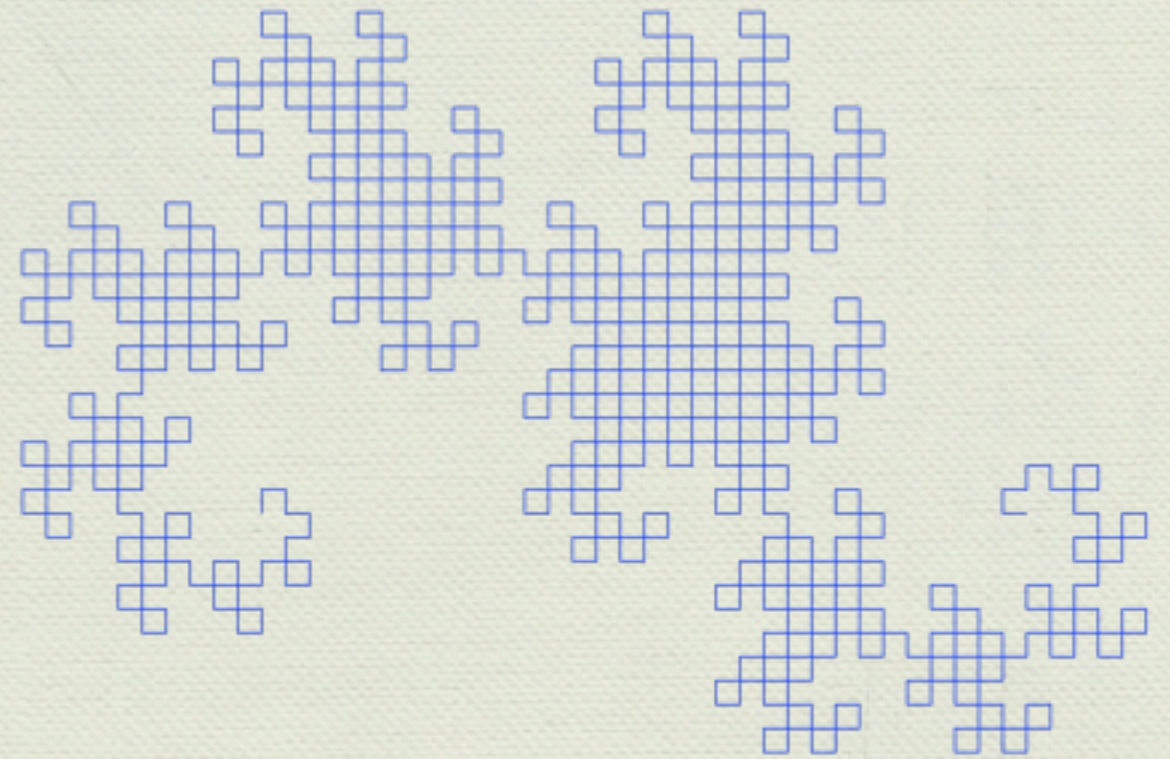
```
1 /drawPrototype {  
2     1 sub  
3     dup -1 eq  
4     { drawLine }  
5     { }  
6     ifelse  
7     1 add  
8 } def  
9  
10 /drawPrototypeReplacementIndex 6 def
```


Prozedur implantieren 2

```
1 /wrapAsDrawMethod { % {proc} -- {proc}
2   //drawPrototype
3   dup length array          % Create array
4     of same length as prototype
5   copy                      % Copy
6     prototype to new array
7   exch 1 index              % -- [array] {
8     proc} [array]
9   drawPrototypeReplacementIndex 3 -1 roll
10    put %put parameter procedure into the
11    prototype
12  cvx
13 } def
```


Ausblick

- ◆ Code säubern
- ◆ Nicht-visuelle Variablen
- ◆ Verzweigungen?
- ◆ Farben?



Q & A