

CURVED SURFACES

TENSOR-PRODUCT-PATCH

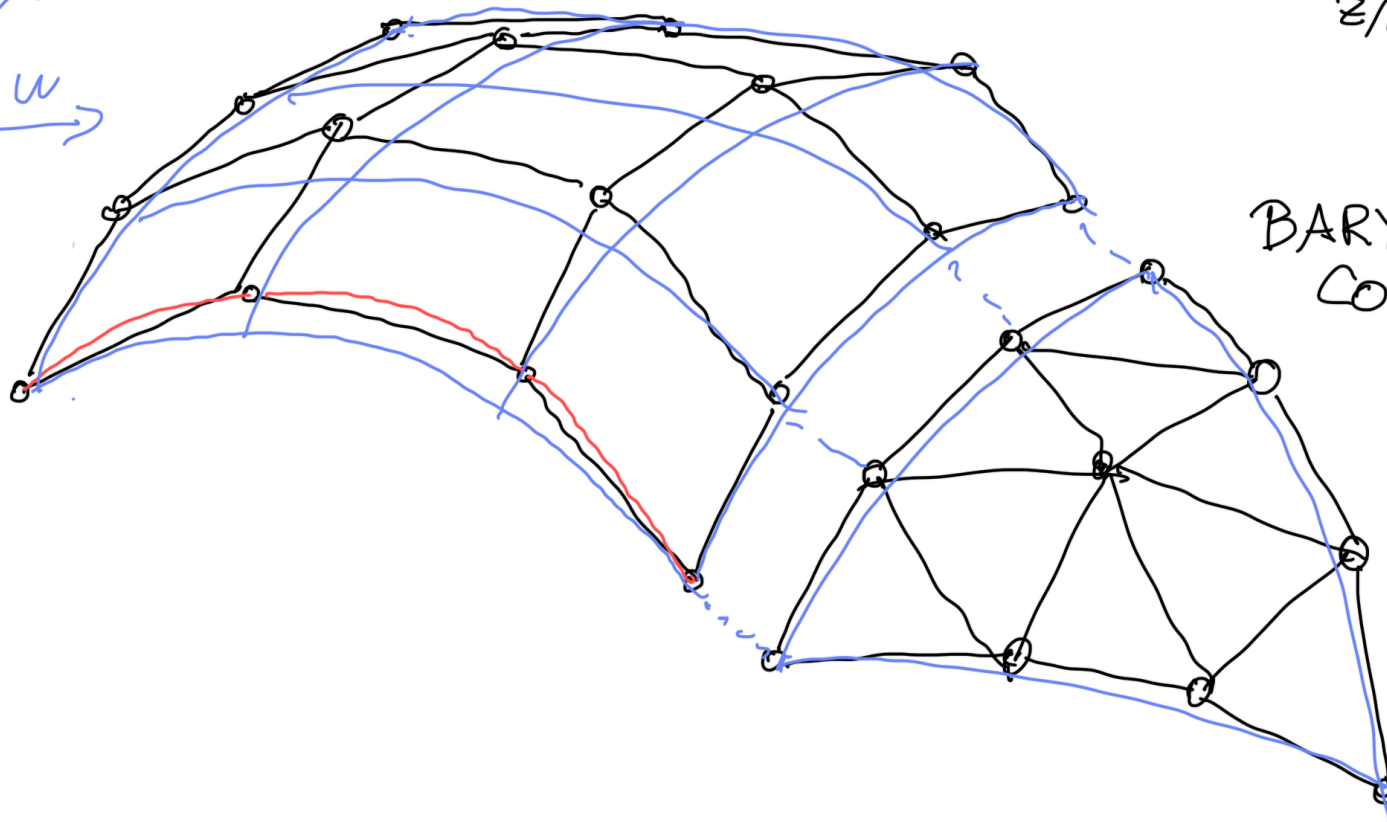
NURBS-PATCHES



Rational

4D → 3D

x/w
 y/w
 z/w



BARYCENTRIC
COORDINATES

SUBDIVISION SURFACES

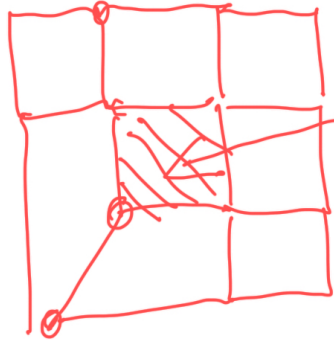
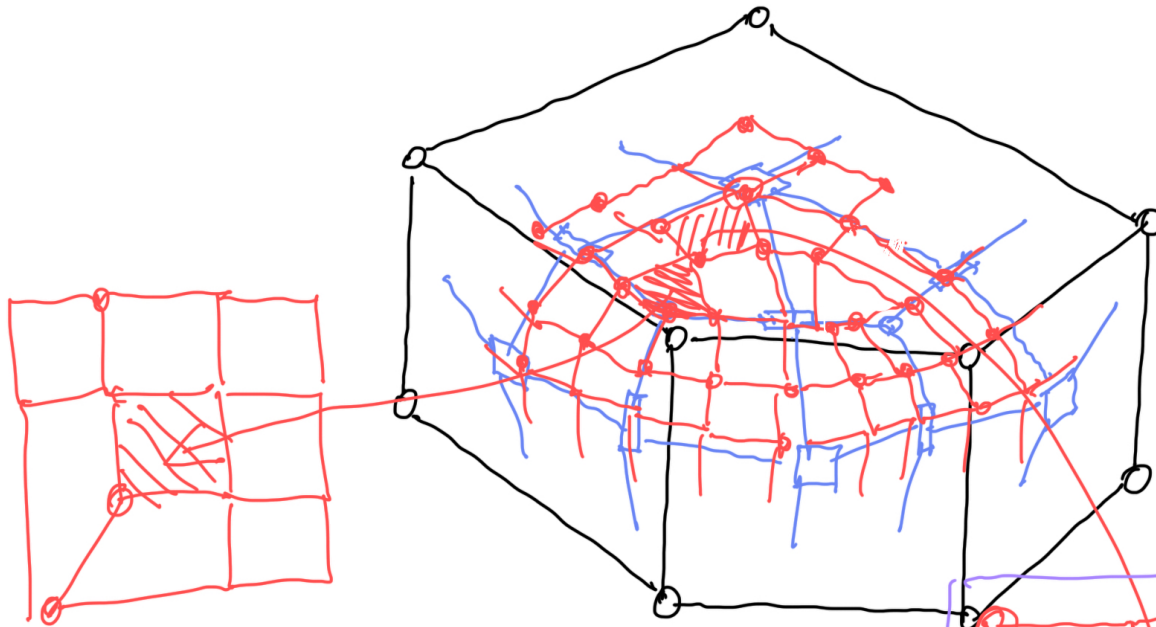
Catmull-Clark Surfaces

$M^{(0)}$... Basemesh

$M^{(1)}$

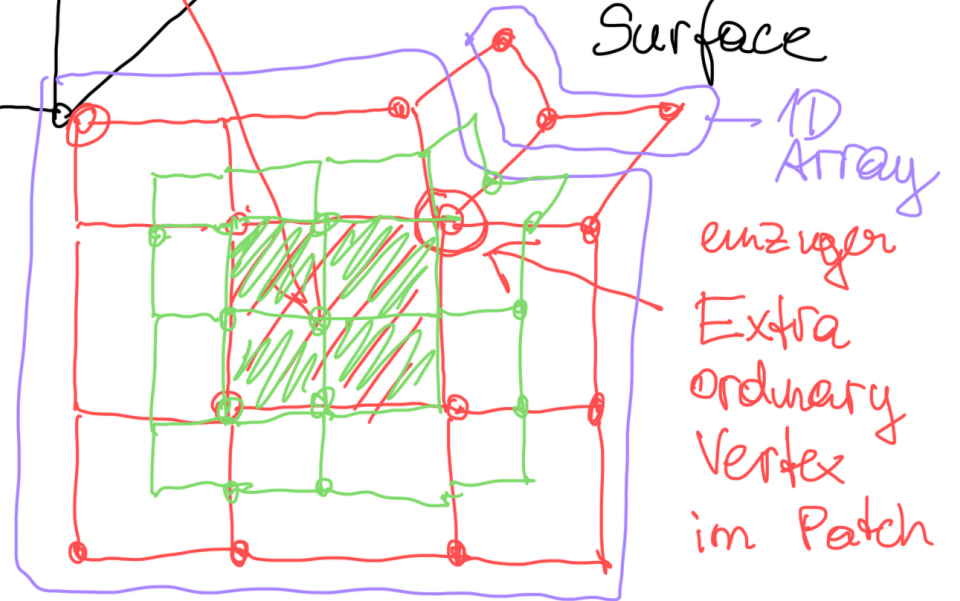
$M^{(2)}$

$M^{(\infty)}$... Subdivision Surface



- ... FaceVertex
- ▣ ... EdgeVertex
- ... VertexVertex

2D Array



einzelner Extraordinary Vertex im Patch

Kantenschärfe ... s

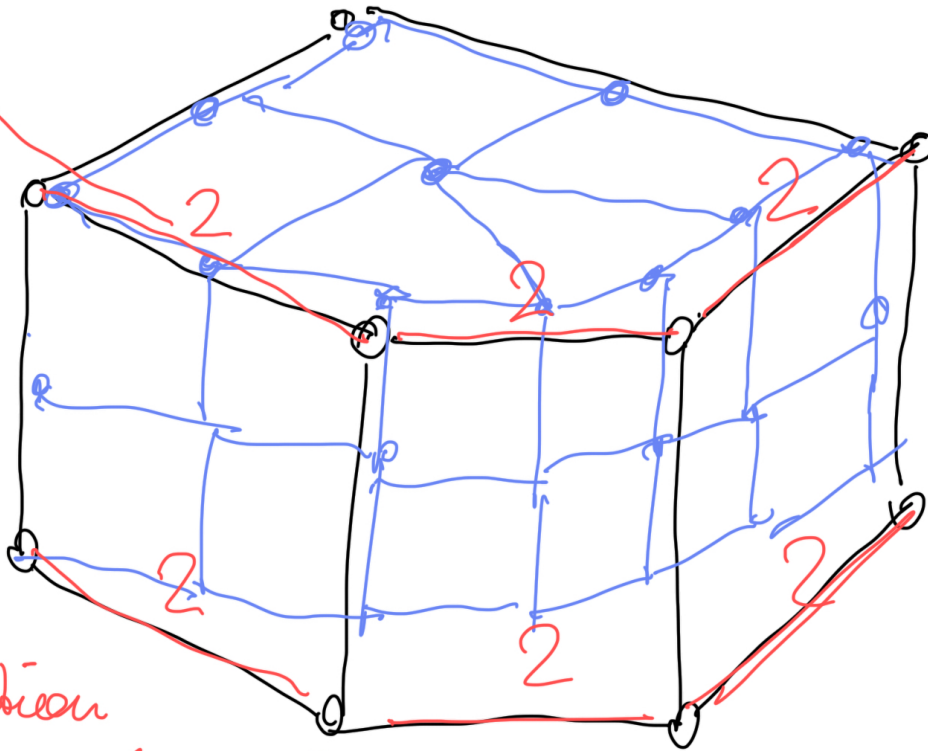
endlich viele

Nicht-Standard
Subdivision
Steps

$s=2$

⋮

natürliche
Zahlen



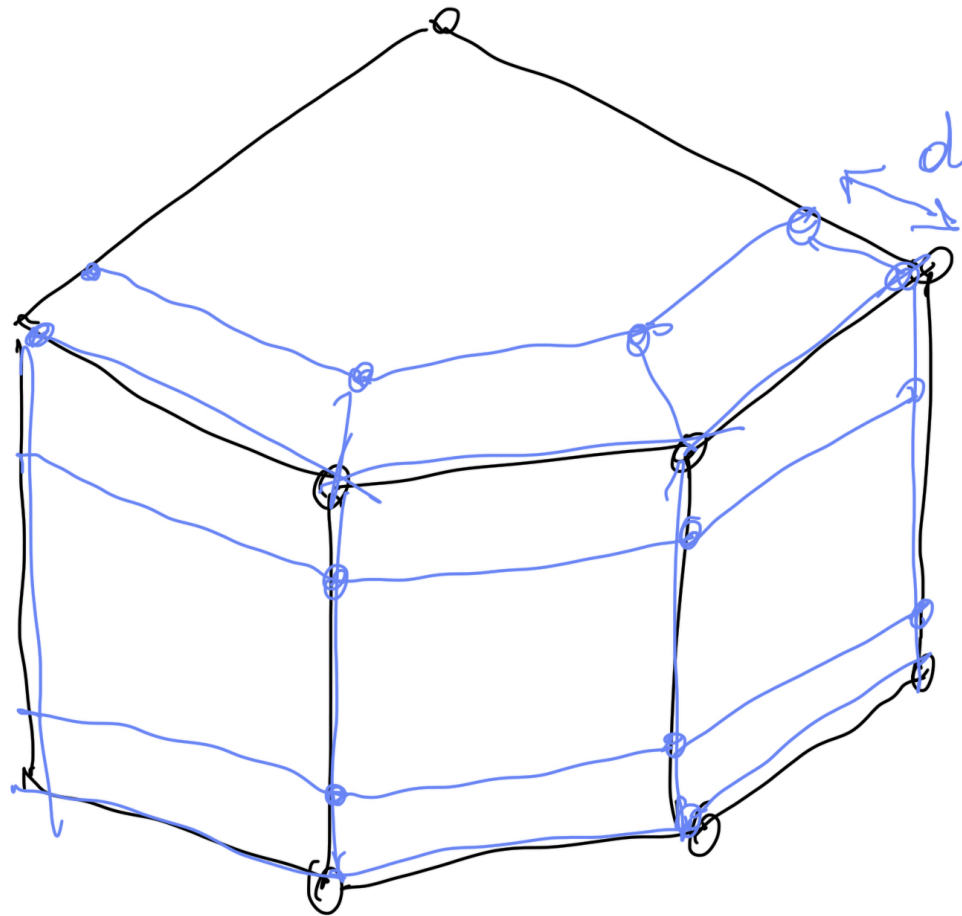
danach

Standard
Subdivision

Erweiterung
lineare
Interpolation

z.B. zw. $s=2$ & $s=3$

Kantenschärfe 2. Variante

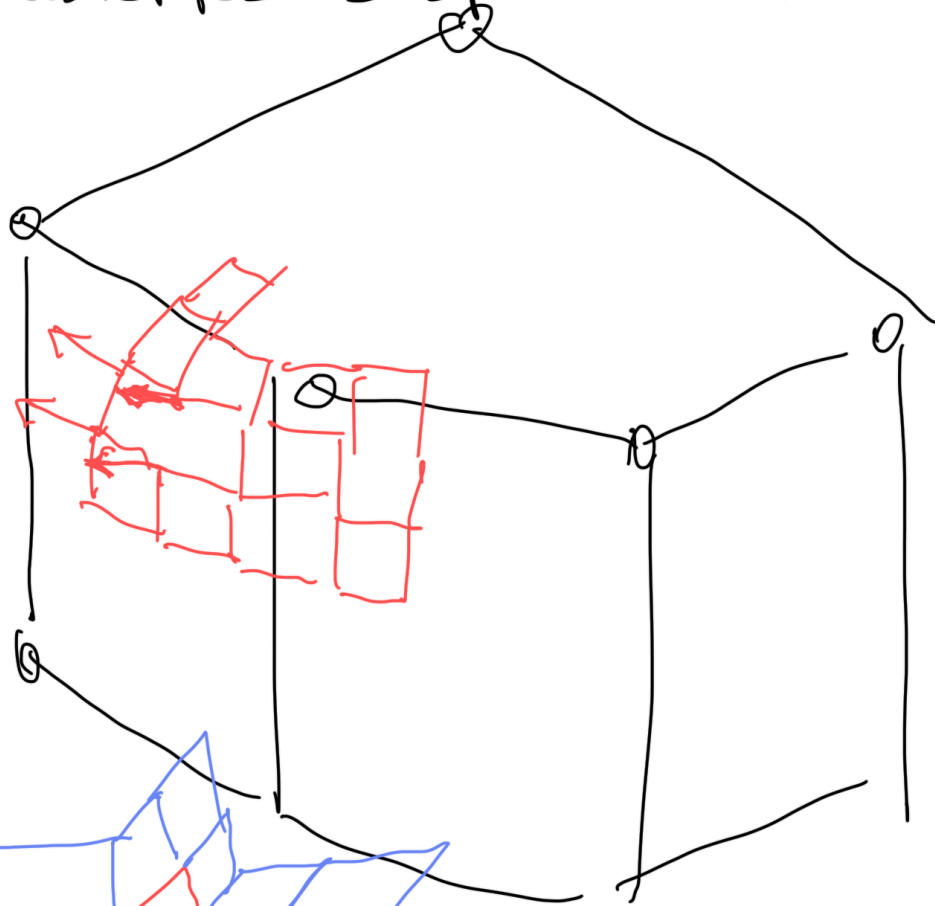


$d=0 \Leftrightarrow$ unendliche
Kantenschärfe

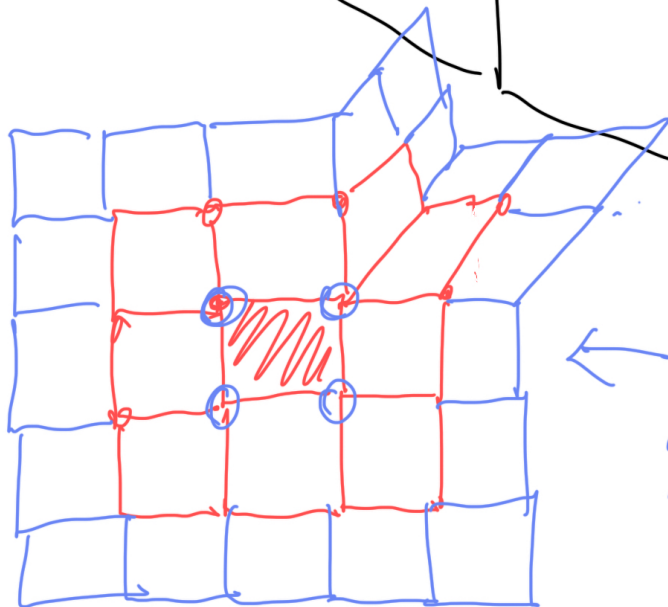
⋮

danach
Standard
Subdivision

Level-Basiertes Displacement



displacement
possible
(at each
level)



aufmodulieren
nach

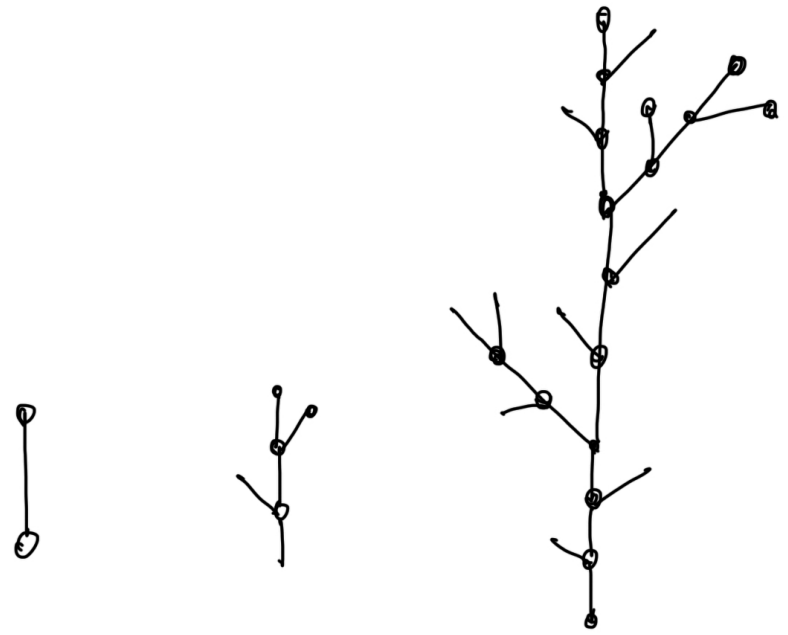
Frequenzspektrum

← für Normalen
2-Nachbarschaft
notwendig

Verzweigung

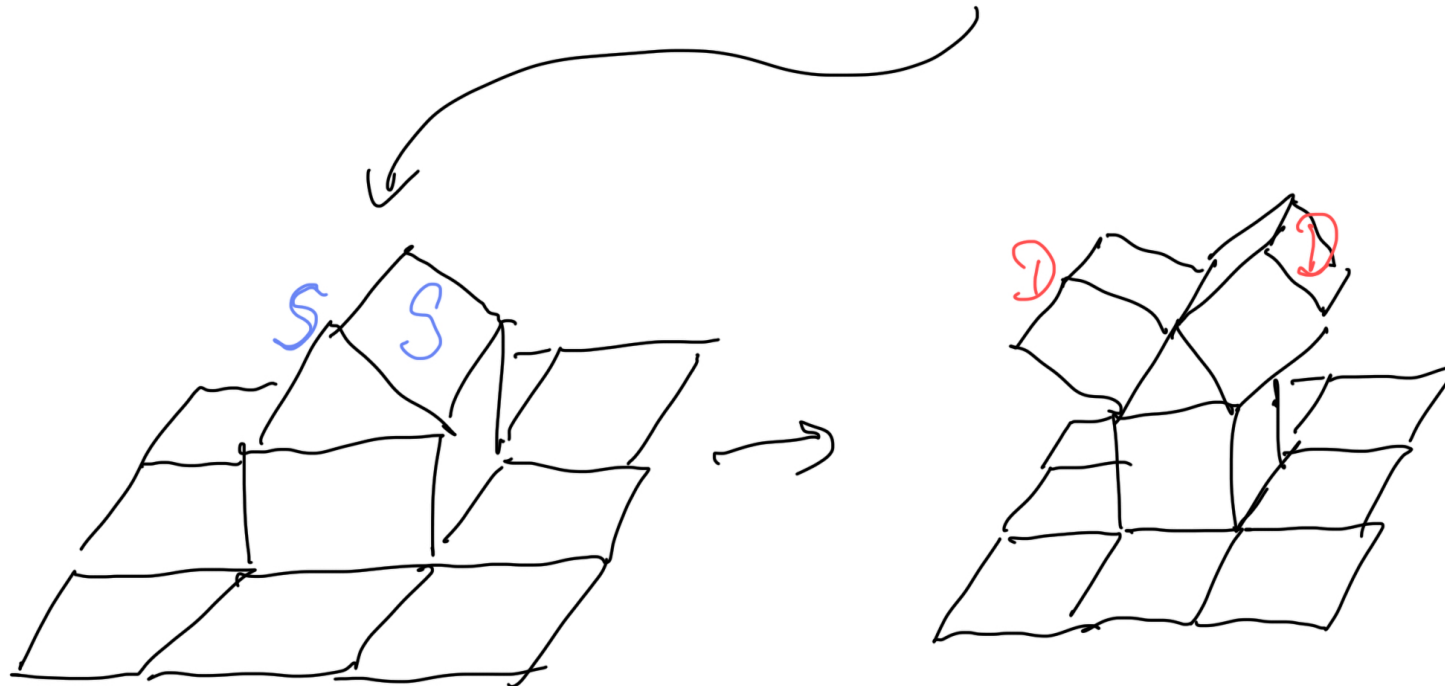
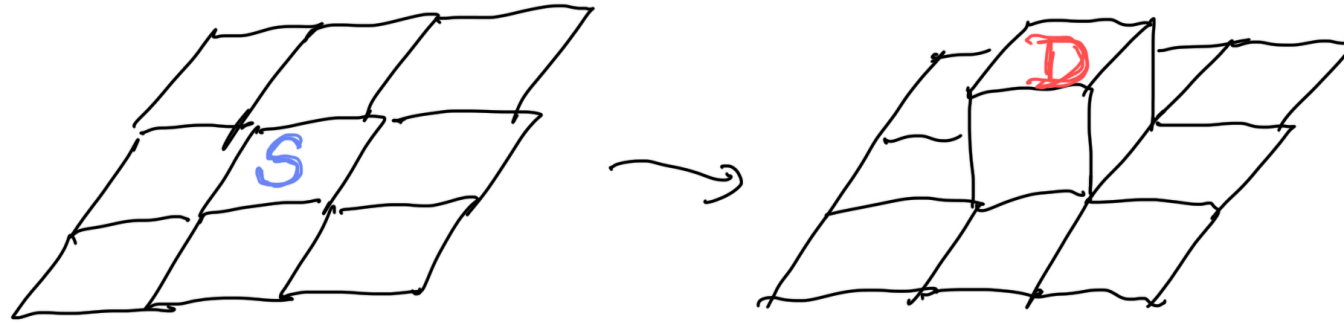
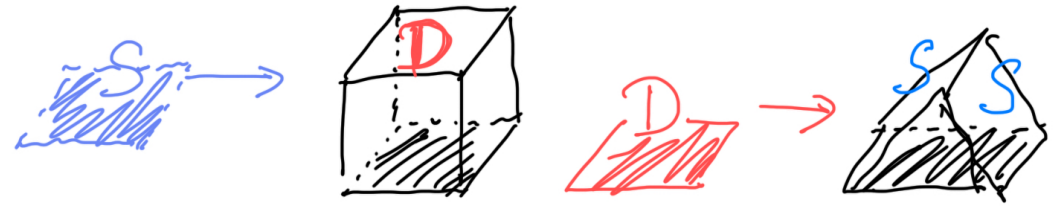
$$S \rightarrow S \begin{bmatrix} -S \\ \uparrow -60^\circ \end{bmatrix} S \begin{bmatrix} +S \\ \uparrow +60^\circ \end{bmatrix} S$$

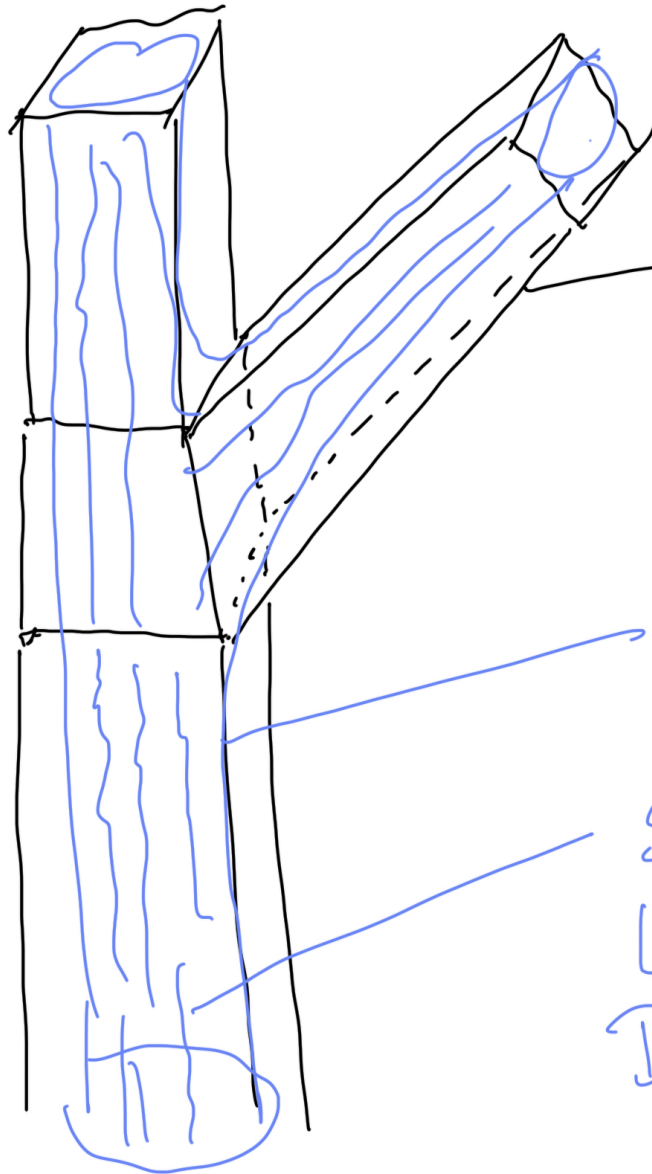
L-System
Symbol-Rewriting



Geometry

Mesh-Based L-System





Mesh-Based
L-Systeme

Subdivision

Struktur mittels
Level-Basierter
Displacement
(z.B. Rinde)