



# Von Magnetismus bis Minimalfläche



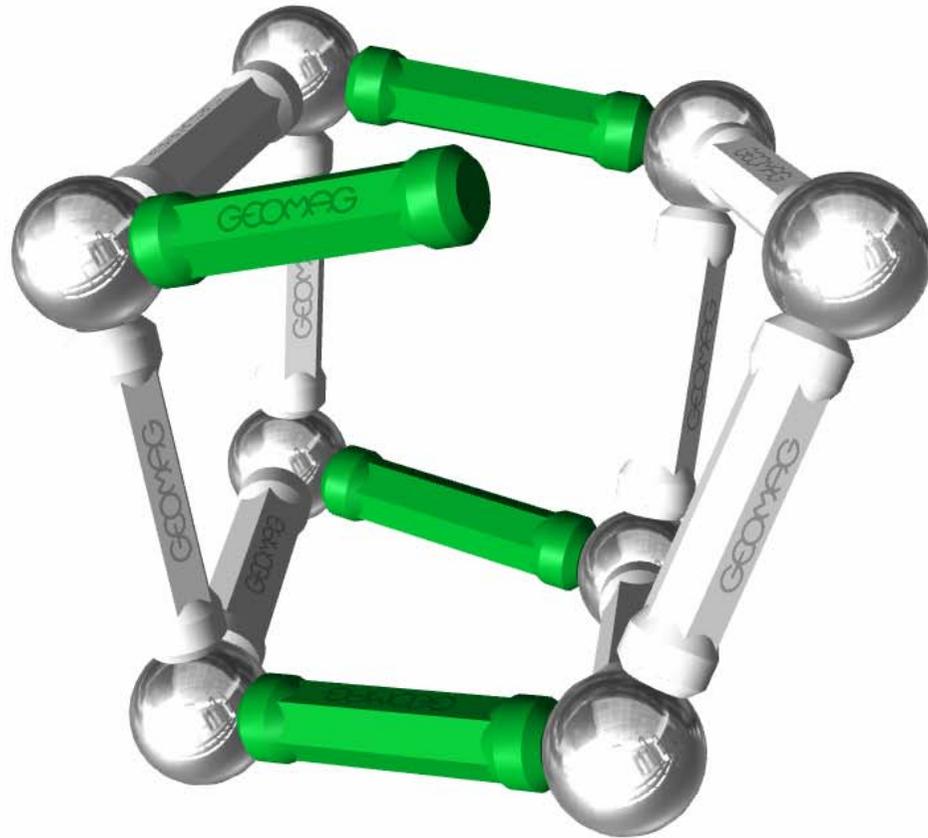
Franz Gruber  
Universität für angewandte Kunst  
Wien



# Motivation:

'Bewegliche  
Keramik'





Interactive Help

Move Tool

- Select one object.  
Move selected objects.  
Draw a selection box.
- CTRL** Select or deselect multiple objects individually.  
Draw a selection/deselection box.
- Select one object.  
Push selected objects away or pull them towards you.
- Rotate selection.

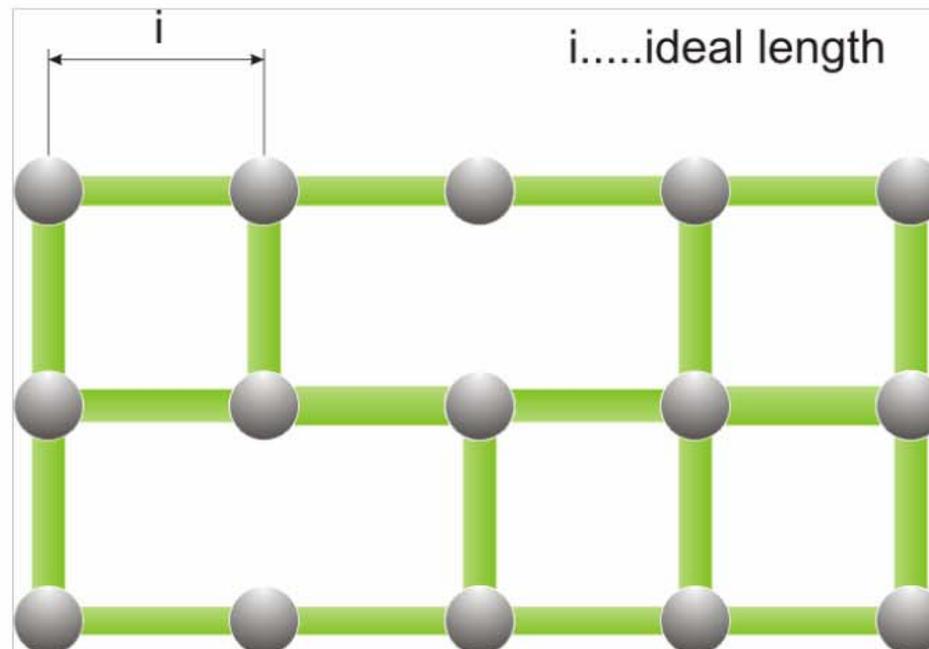
Part List

- 9 Spheres
- 13 Rods
- 0 Panels
- 0 Gift Panels
- 0 Deko Panels



# Idee:

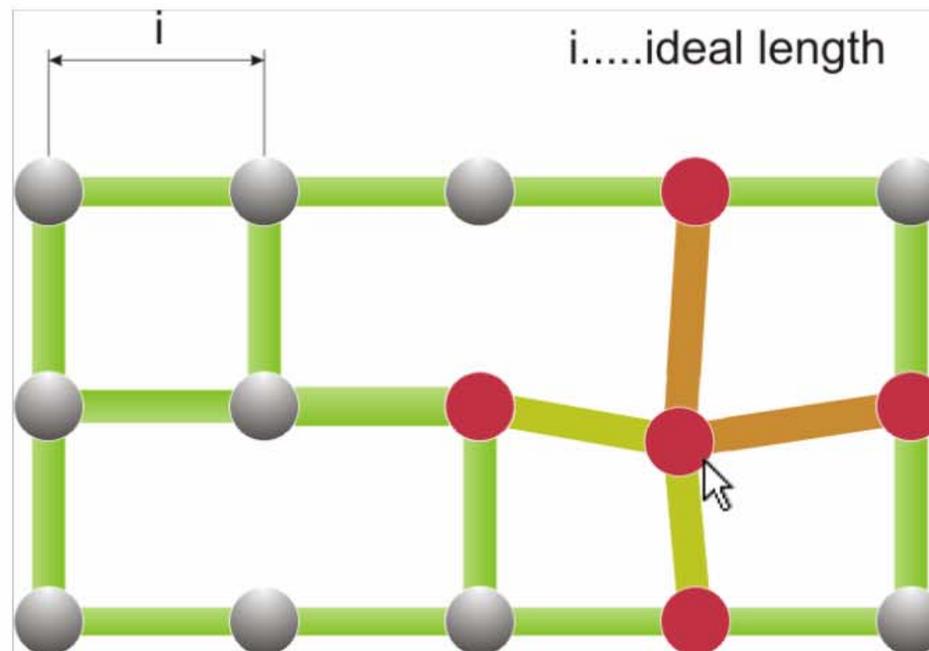
- frei wählbare Initialposition





# Idee:

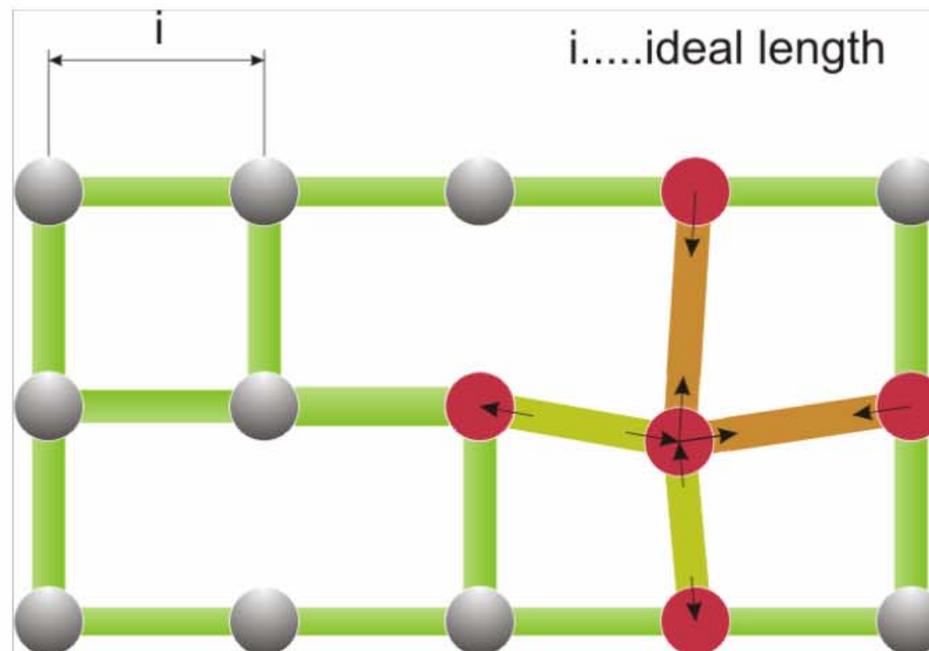
- Maus zieht an einem Knoten





# Idee:

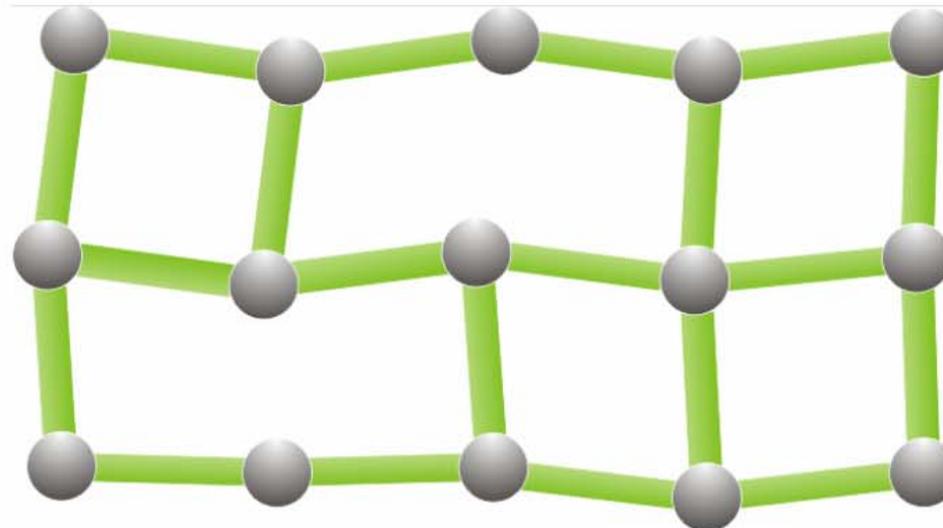
- Maus zieht an einem Knoten
- iterative Wiederherstellung der idealen Längen  
(kleine Versetzungen)





# Idee:

- Maus zieht an einem Knoten
- iterative Wiederherstellung der idealen Längen (kleine Versetzungen)
- Kettenreaktion konvergiert





# Algorithmus:

while (kantenlängen nicht ideal)

{

1. Alle Kugeln merken sich ihre resultierende Disposition (Vektor)

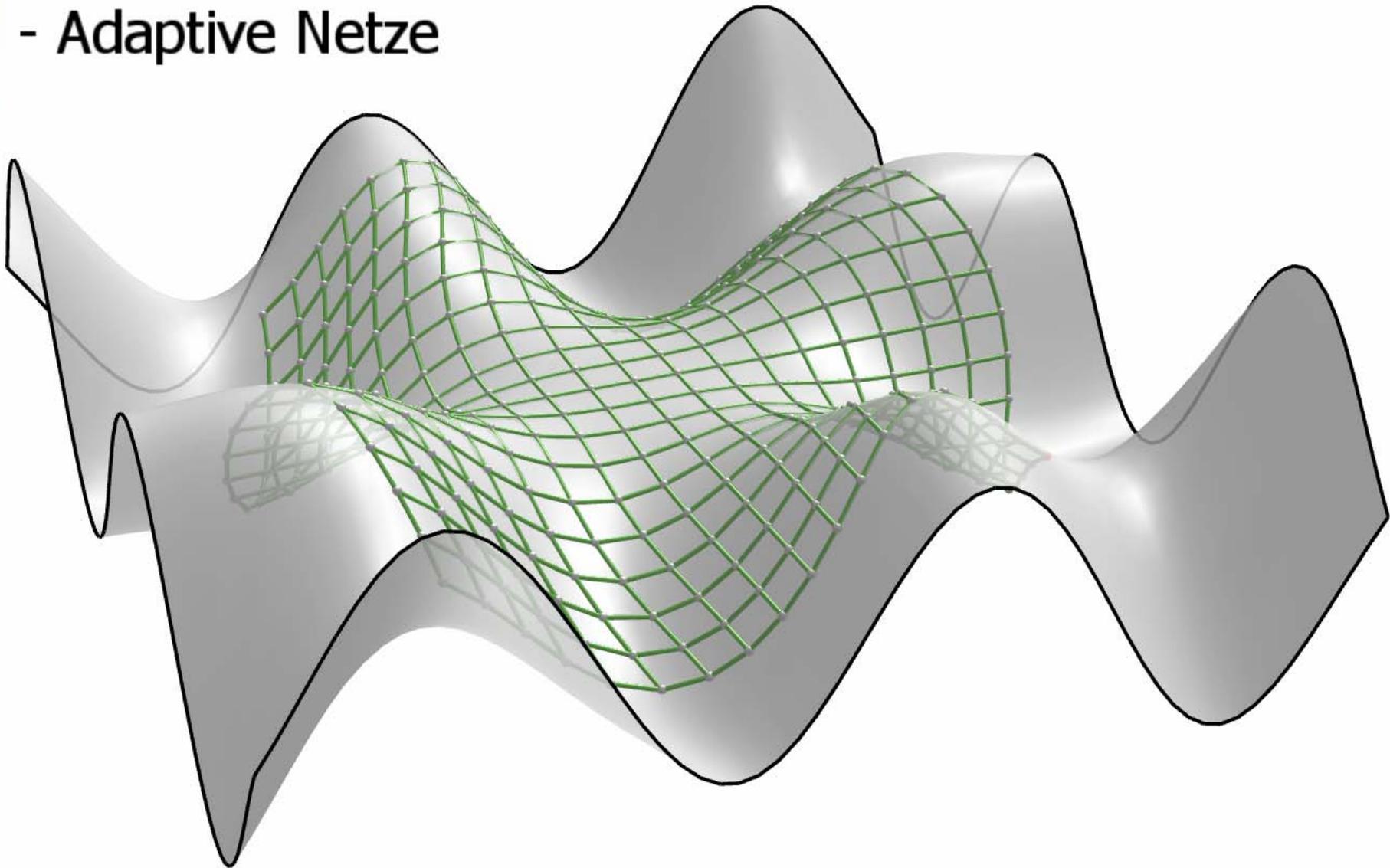
2. Alle Kugeln werden 'infinitesimal' in diese Richtung versetzt

}



# Anwendungen:

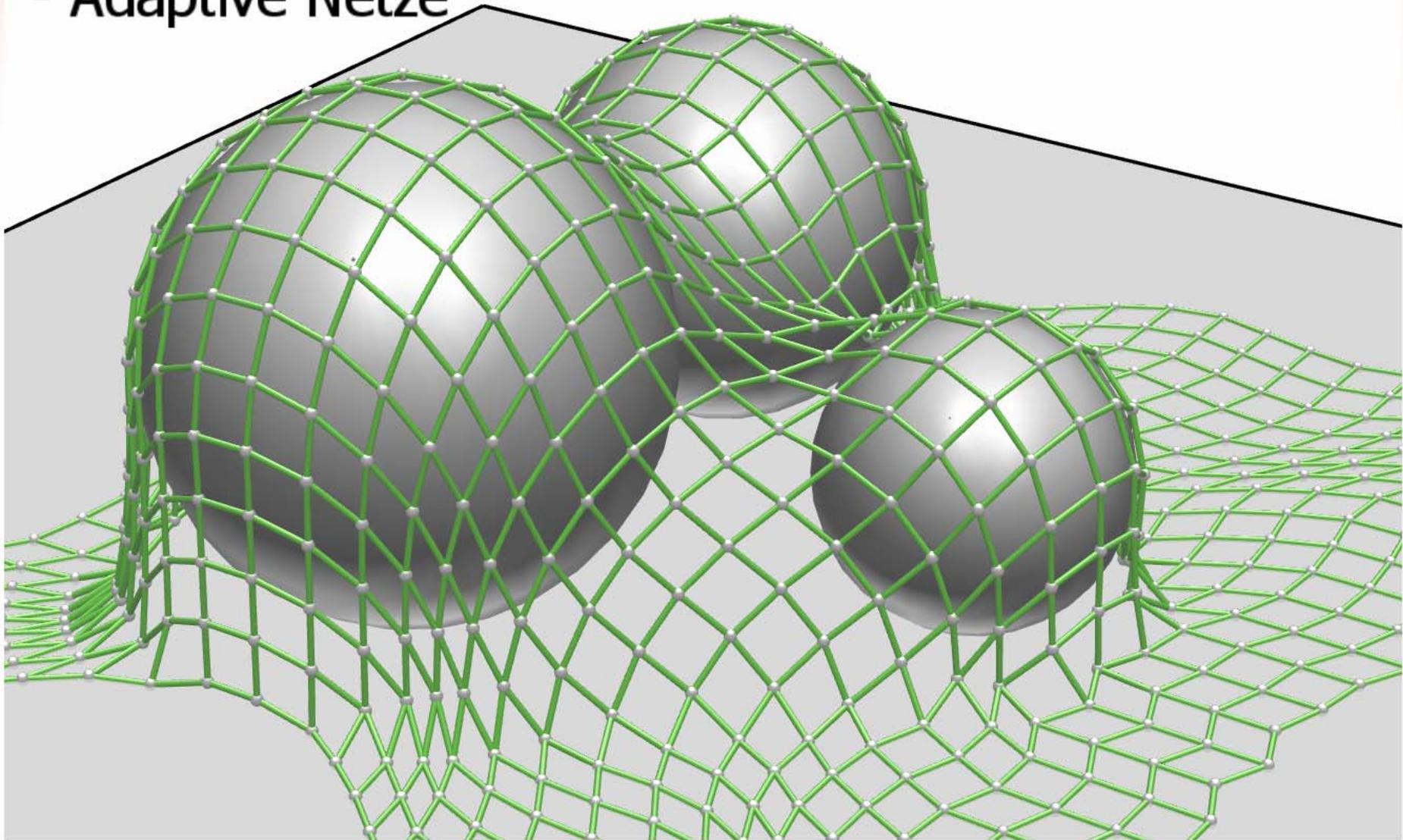
- Adaptive Netze





# Anwendungen:

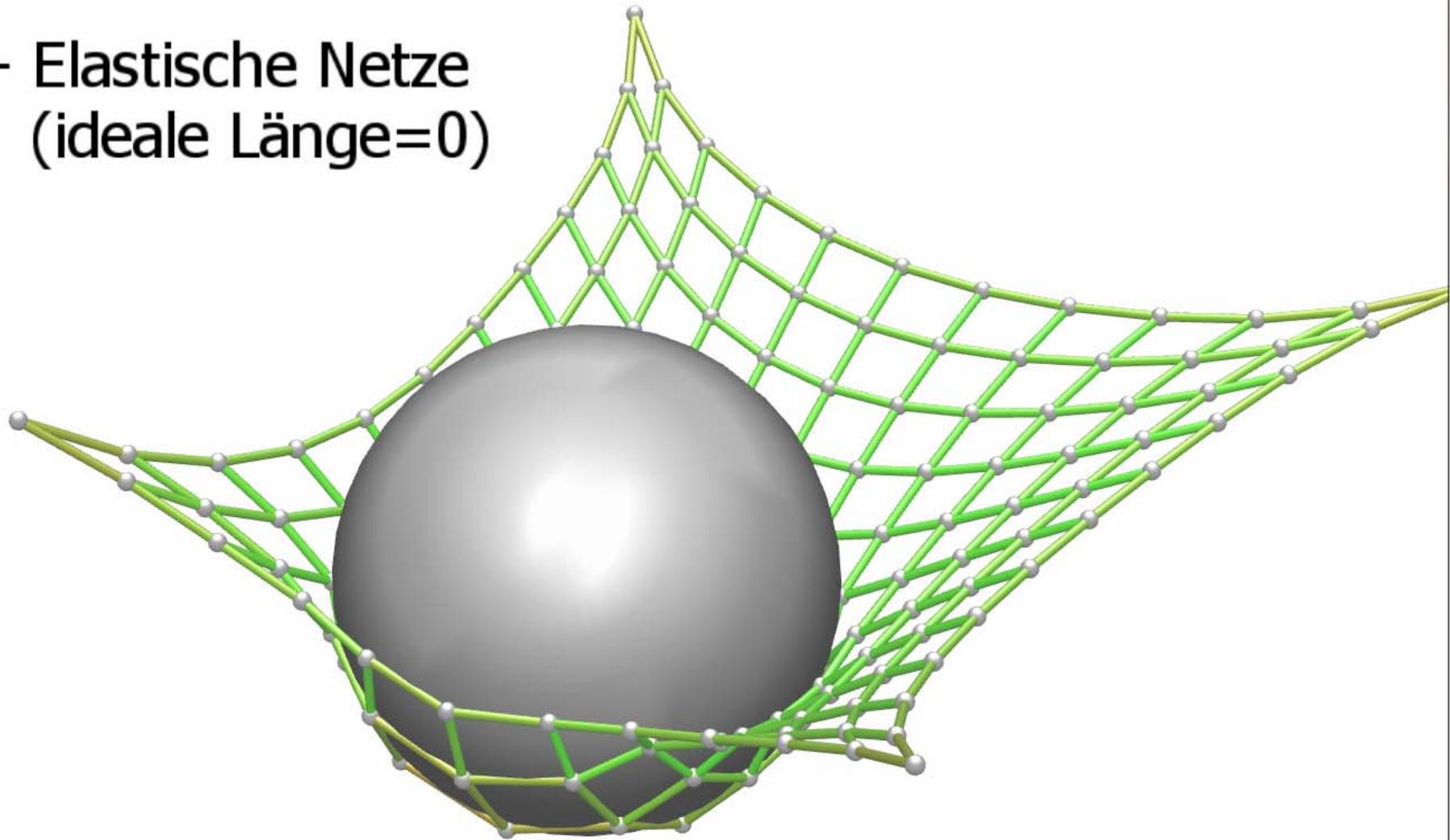
- Adaptive Netze





# Anwendungen:

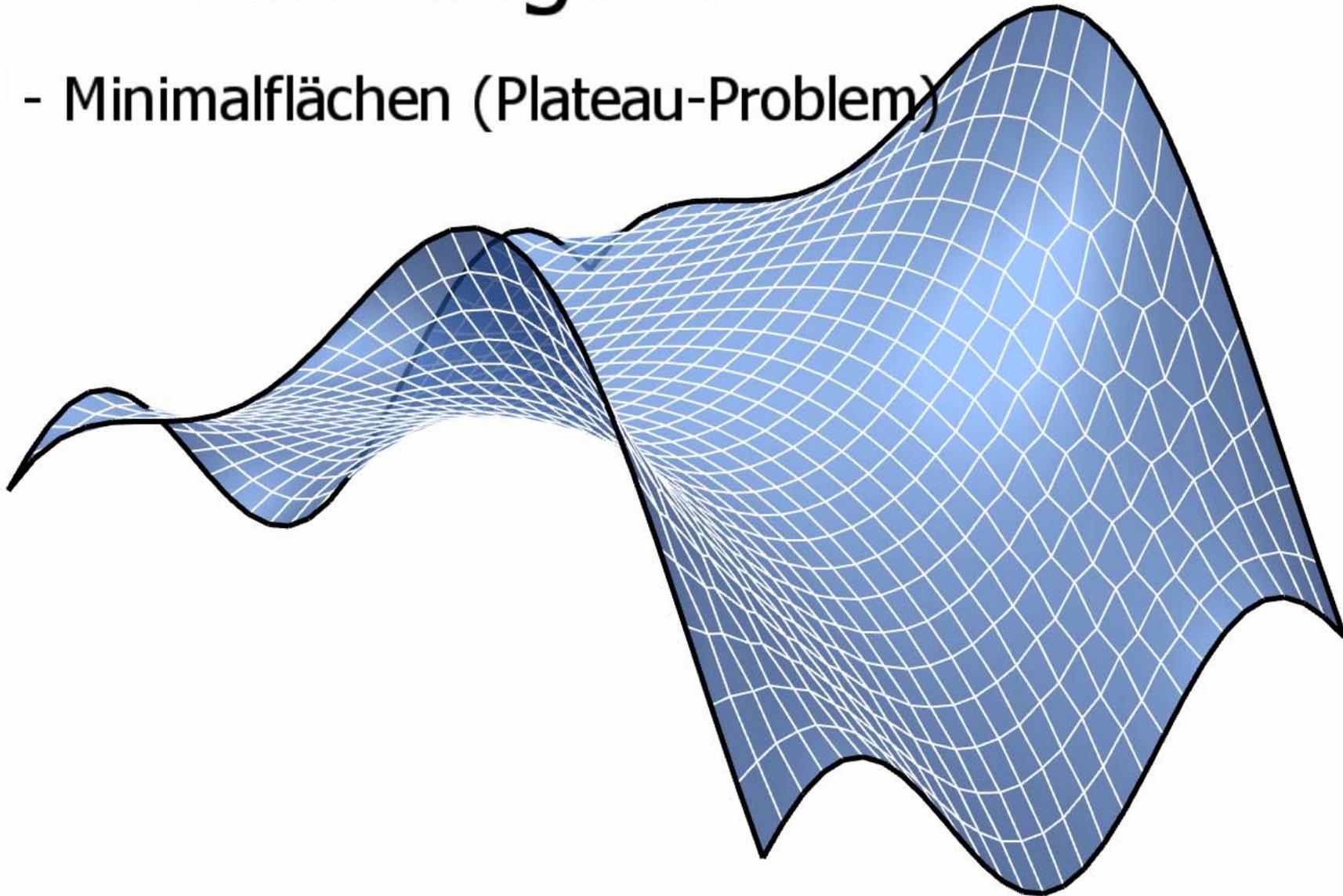
- Elastische Netze  
(ideale Länge=0)





# Anwendungen:

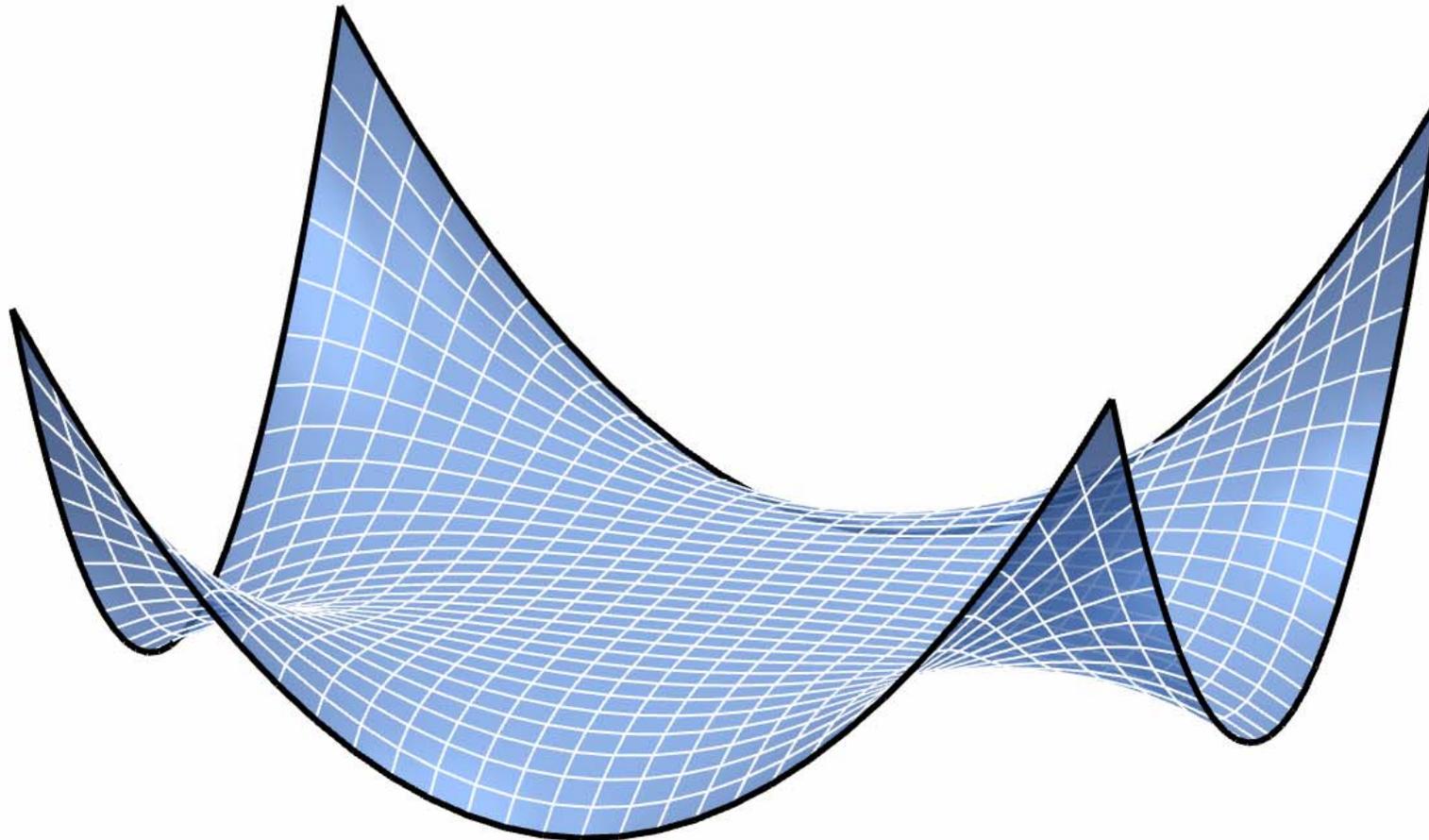
- Minimalflächen (Plateau-Problem)





# Anwendungen:

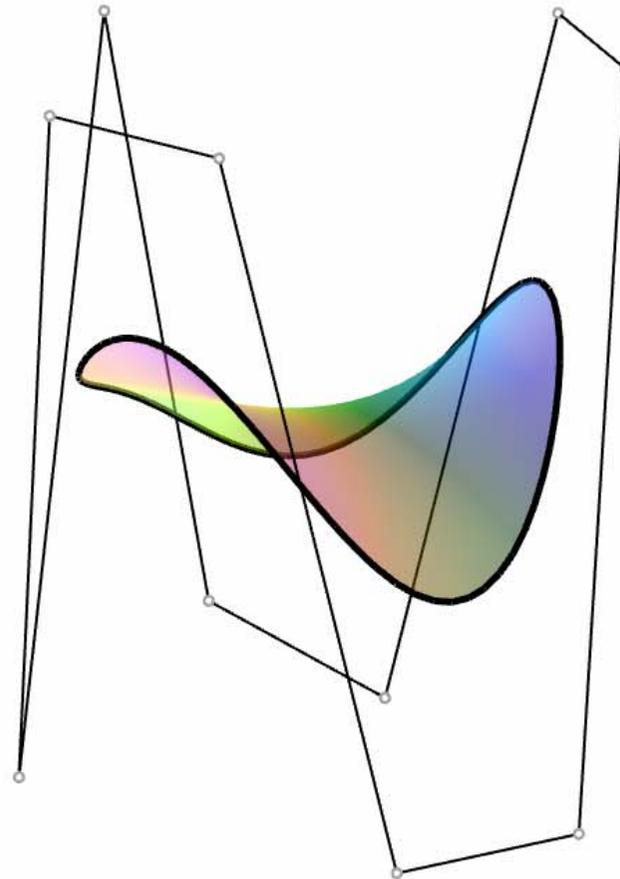
- Minimalflächen (Plateau-Problem)





# Anwendungen:

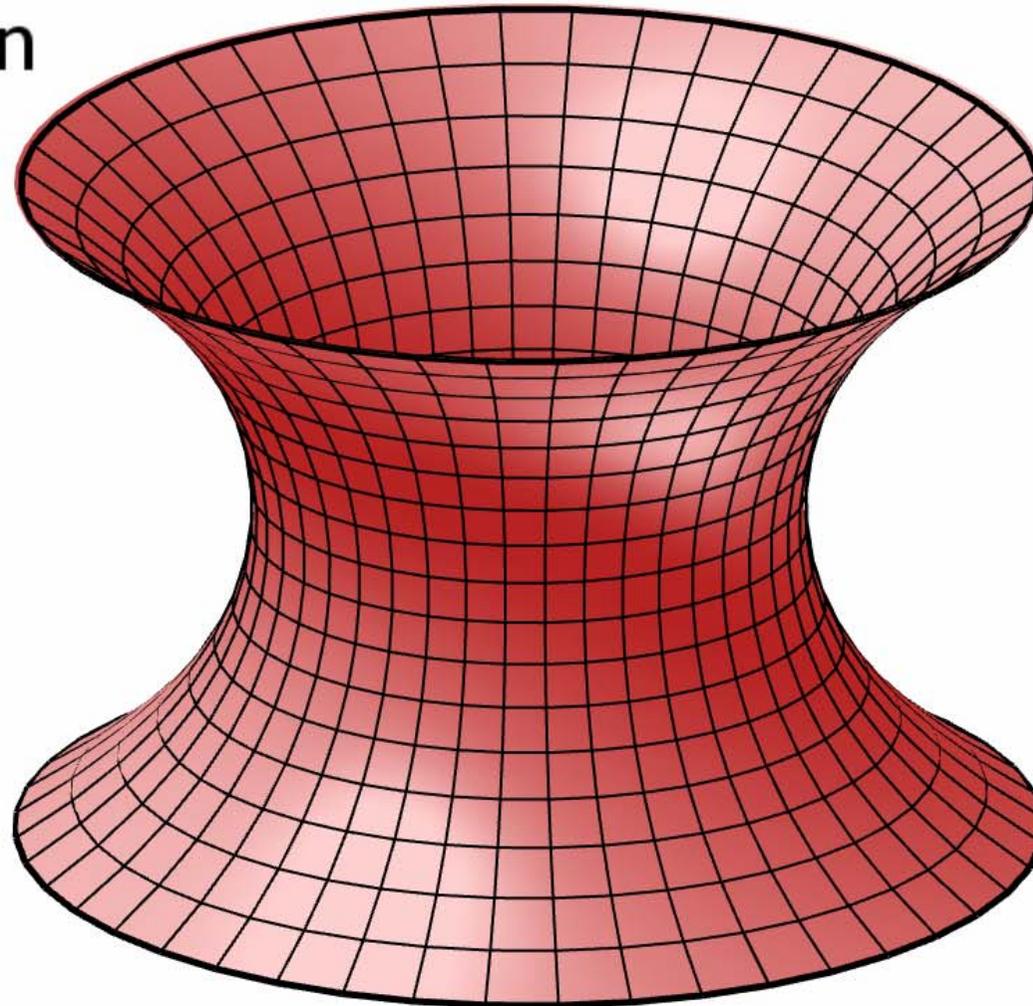
- Minimalflächen  
Drahtschlinge





# Anwendungen:

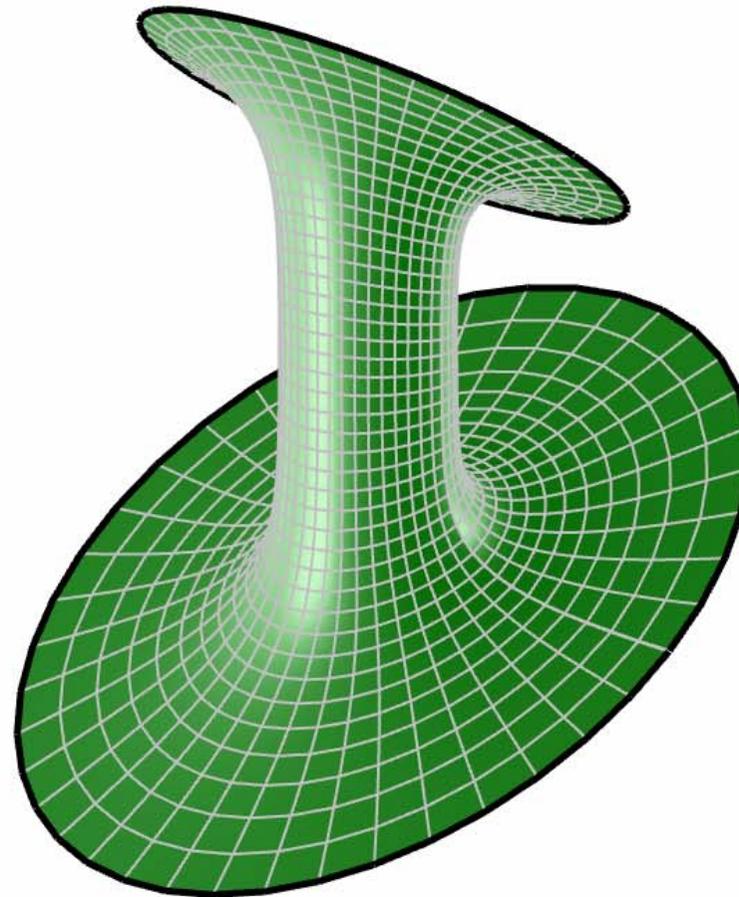
- Minimalflächen  
Katenoid





# Anwendungen:

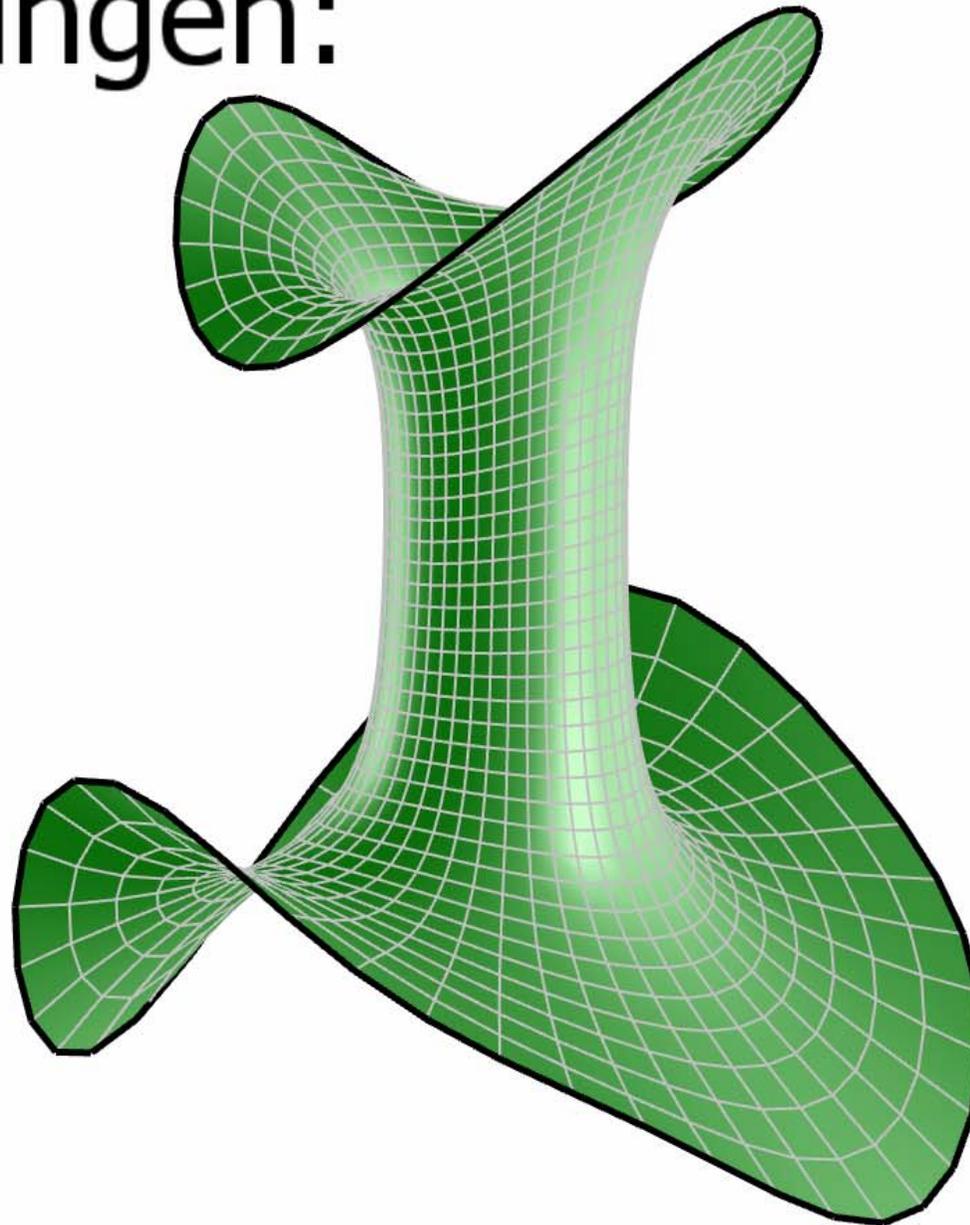
- Minimalflächen  
Allgemeines  
Katenoid





# Anwendungen:

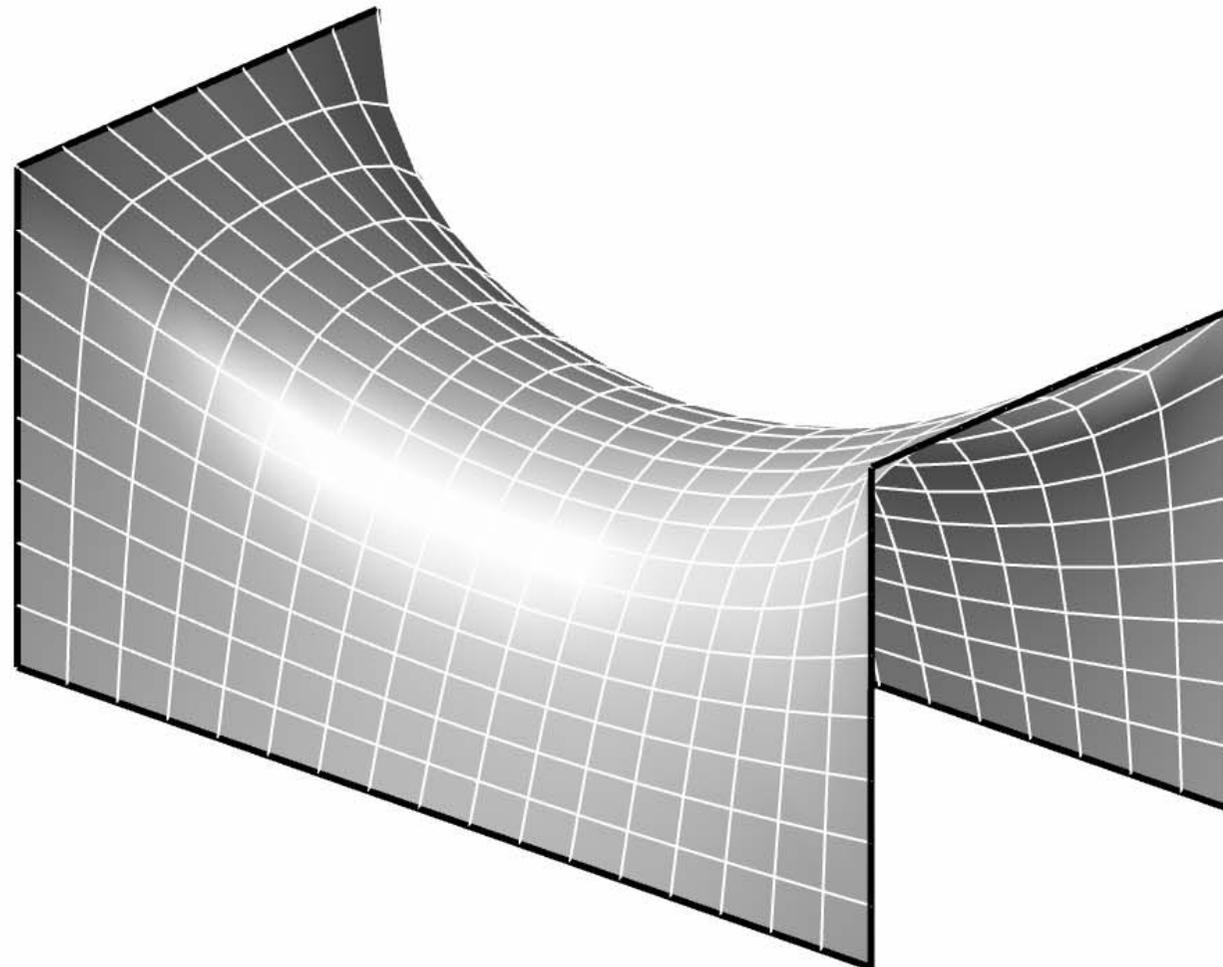
- Minimalflächen  
Allgemeines  
Katenoid





# Anwendungen:

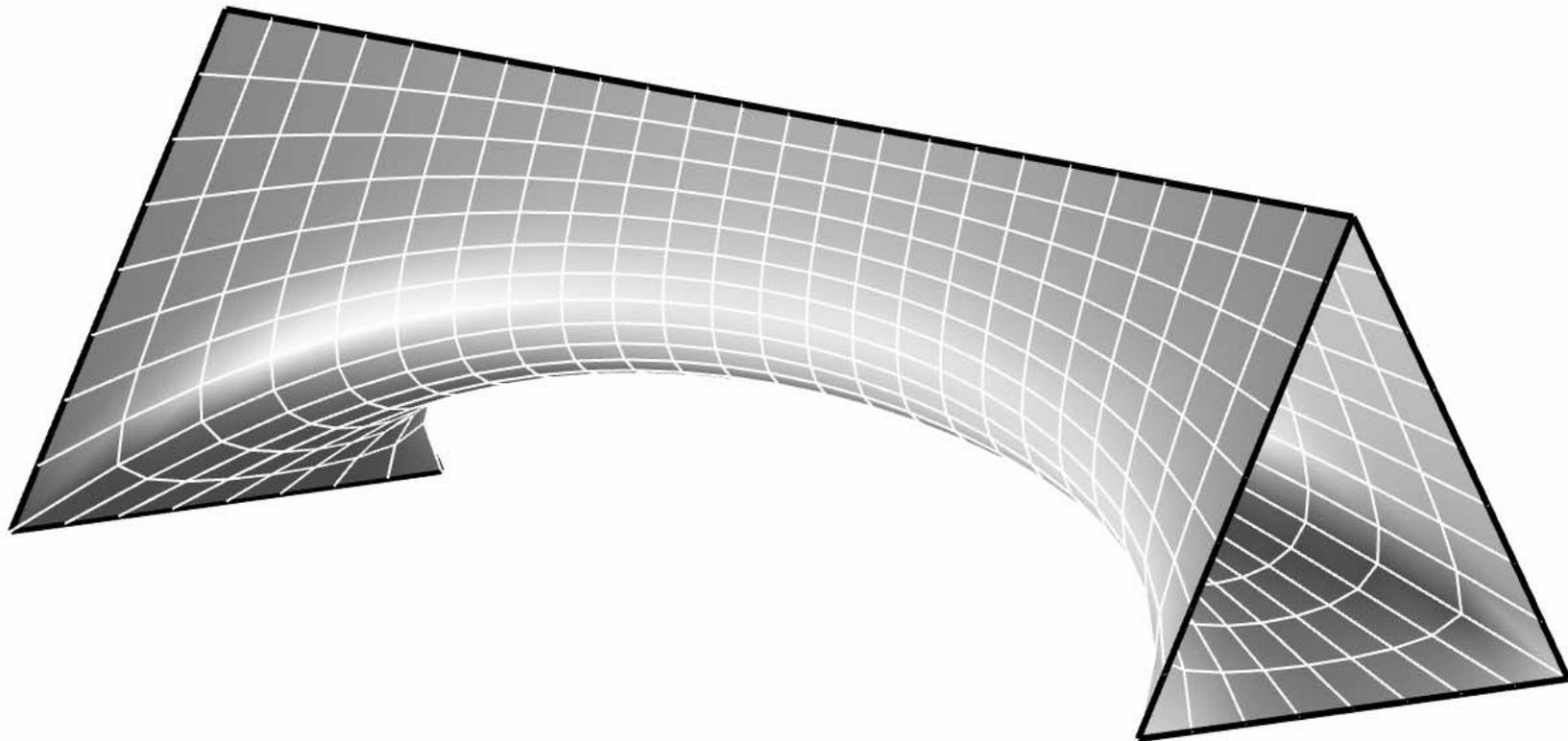
- Minimalflächen  
Scherk





# Anwendungen:

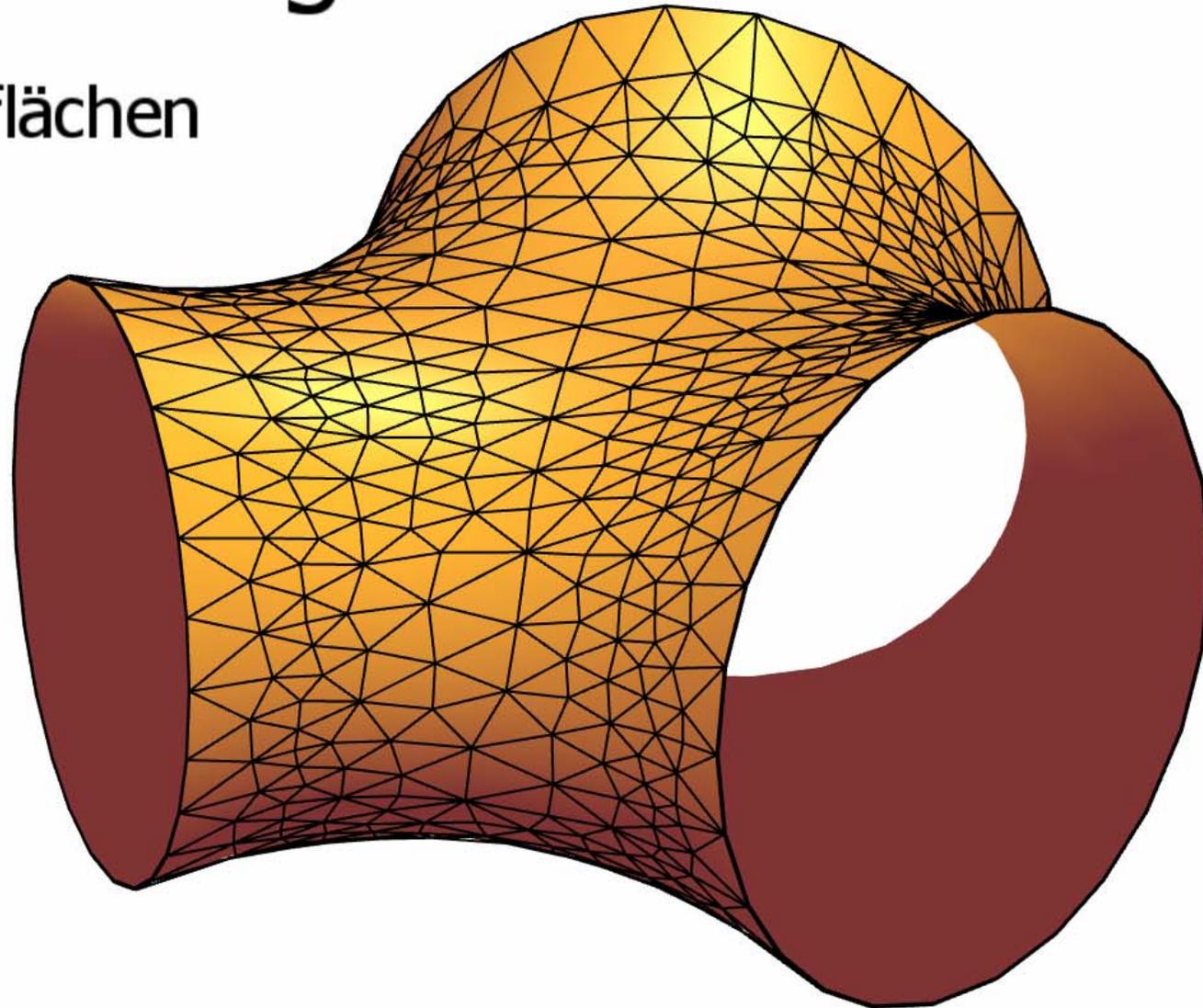
- Minimalflächen  
Scherk





# Anwendungen:

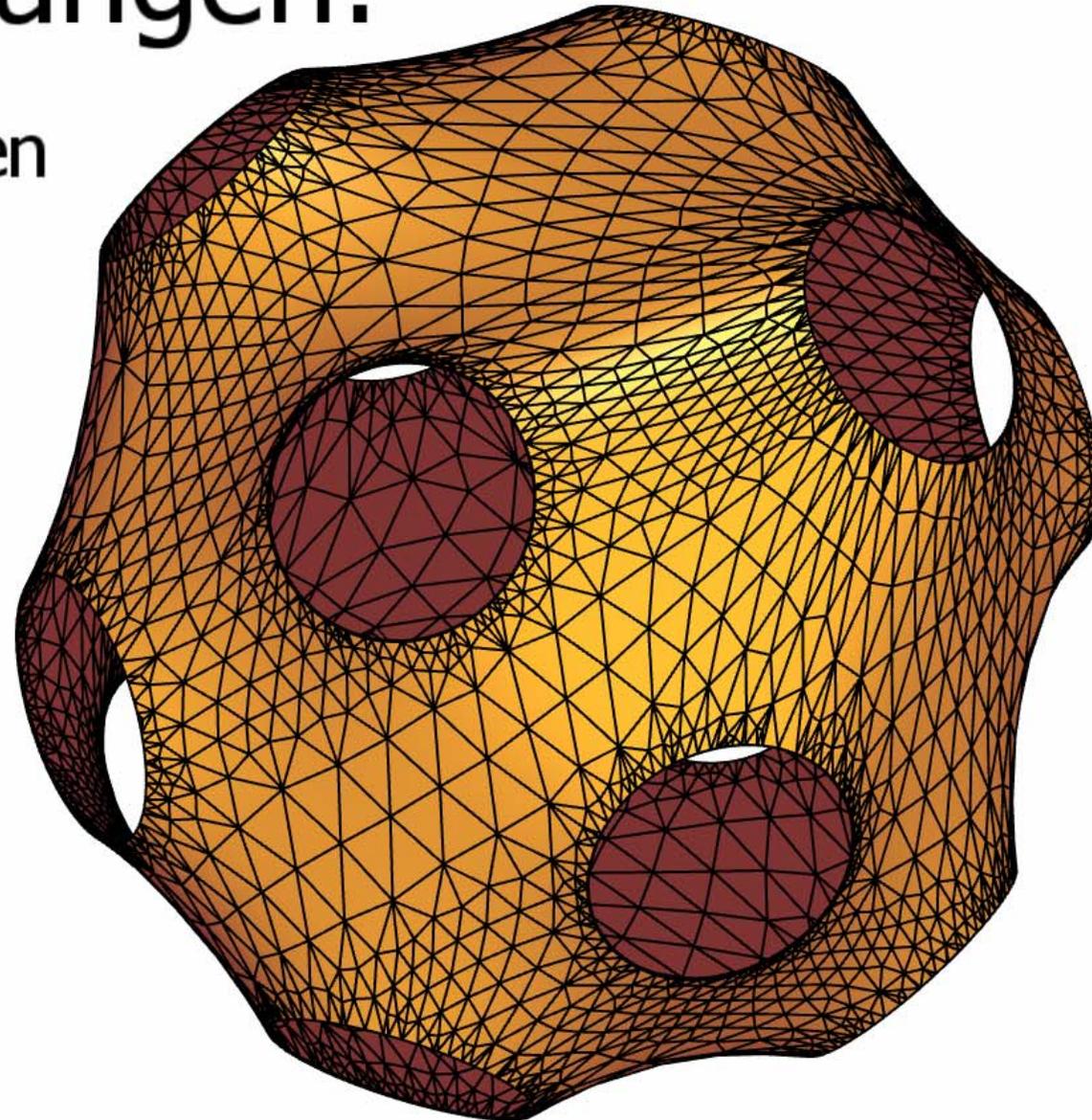
- Minimalflächen  
Trinoid





# Anwendungen:

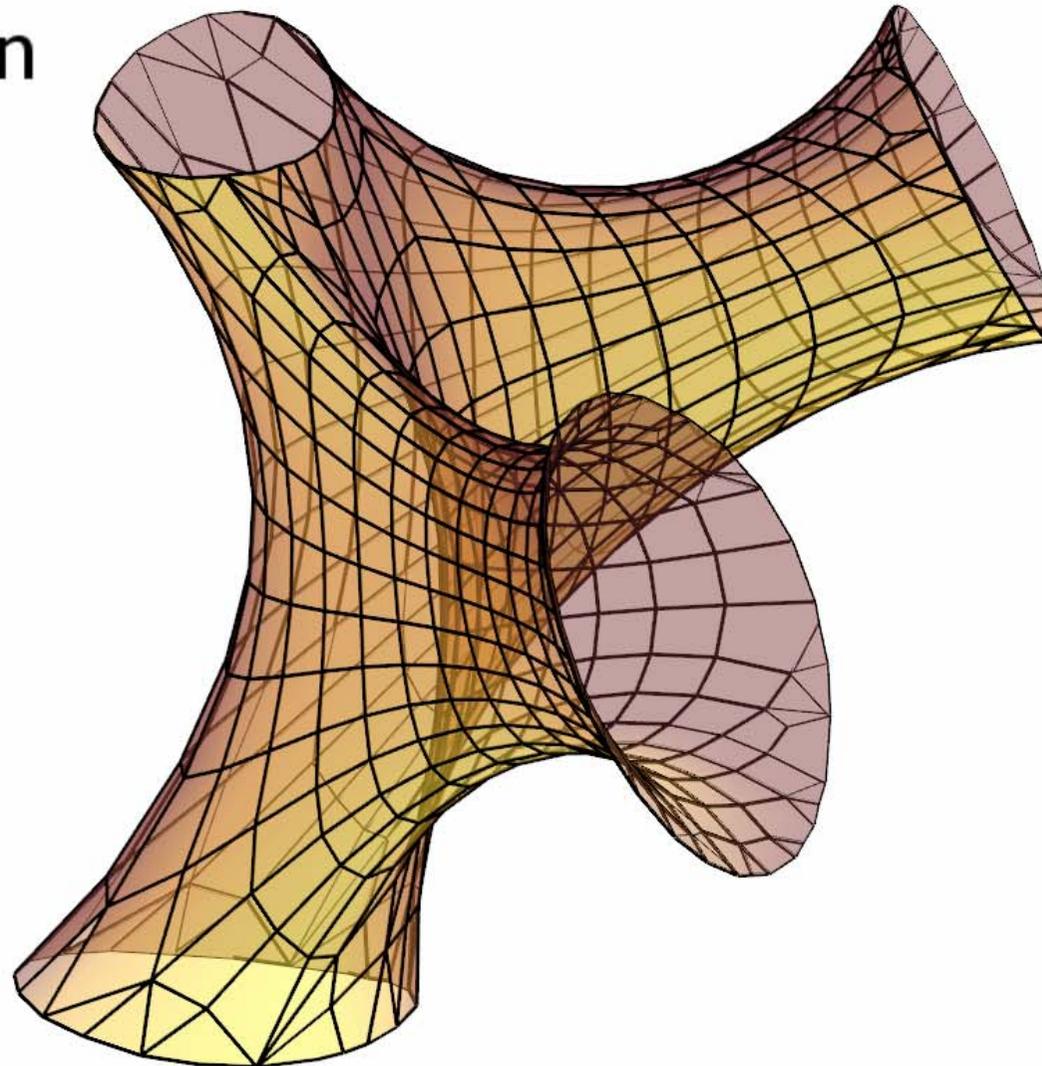
- Minimalflächen  
Schoen





# Anwendungen:

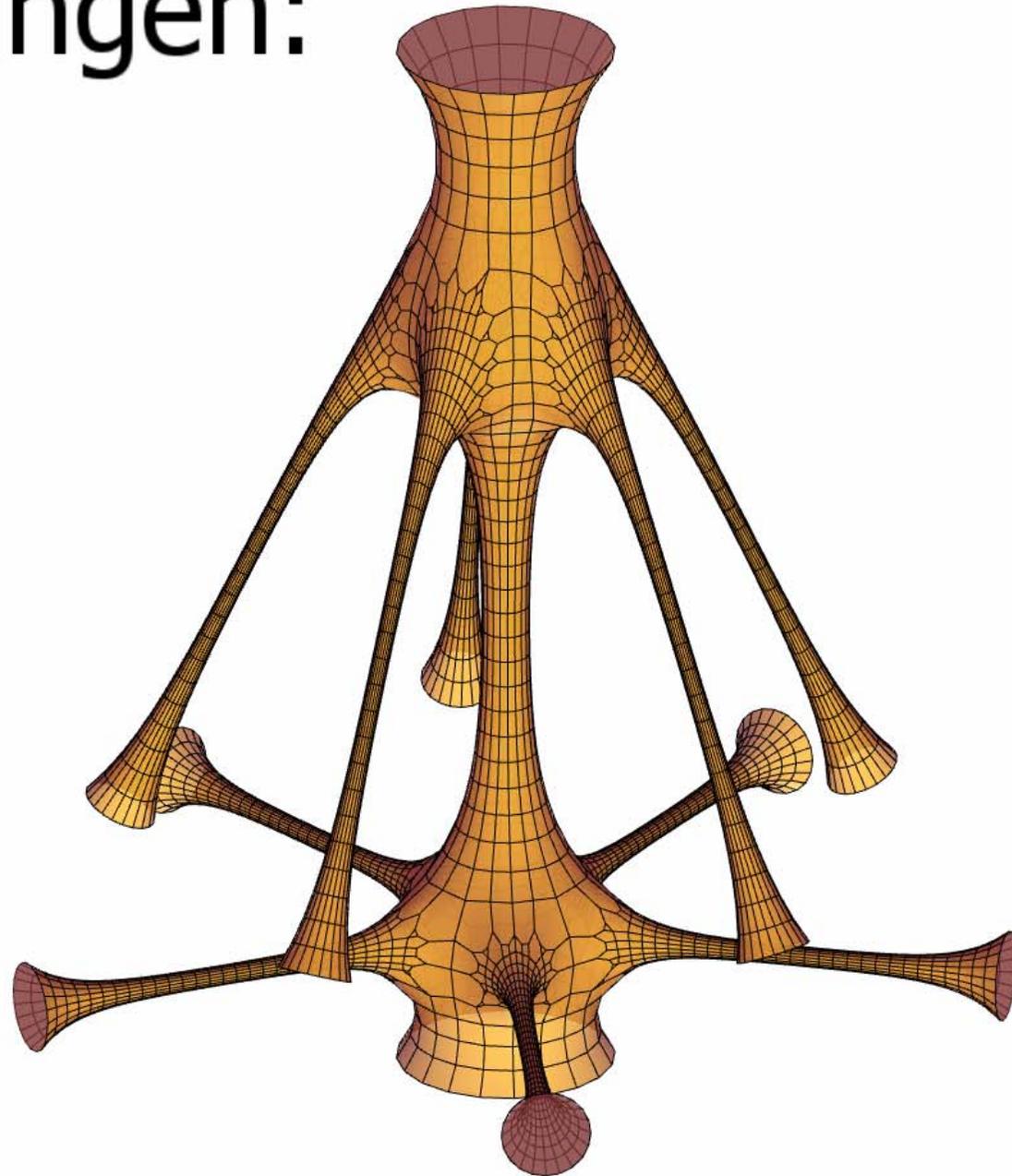
- Minimalflächen  
Allgemeine  
Randkurve





# Anwendungen:

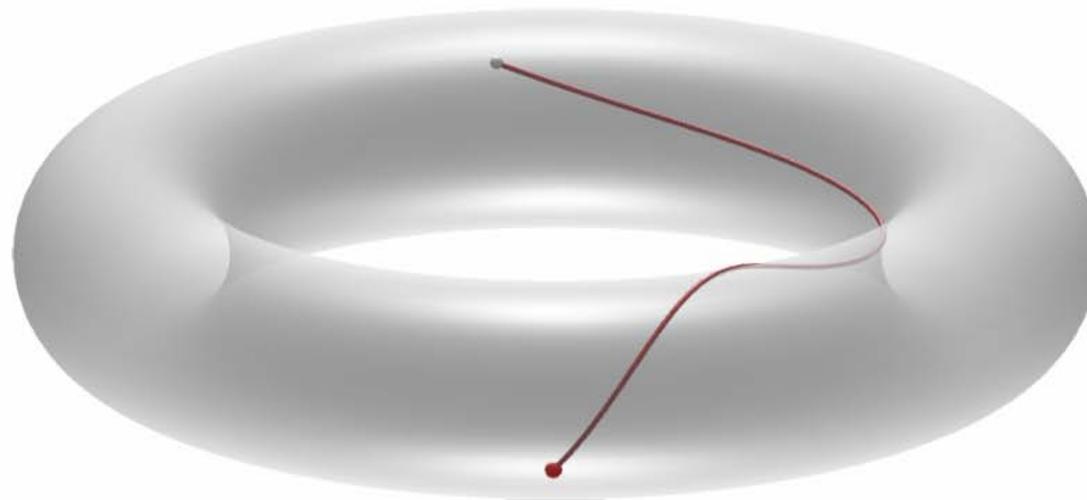
- Minimalflächen  
Allgemeine  
Randkurve





# Aussichten:

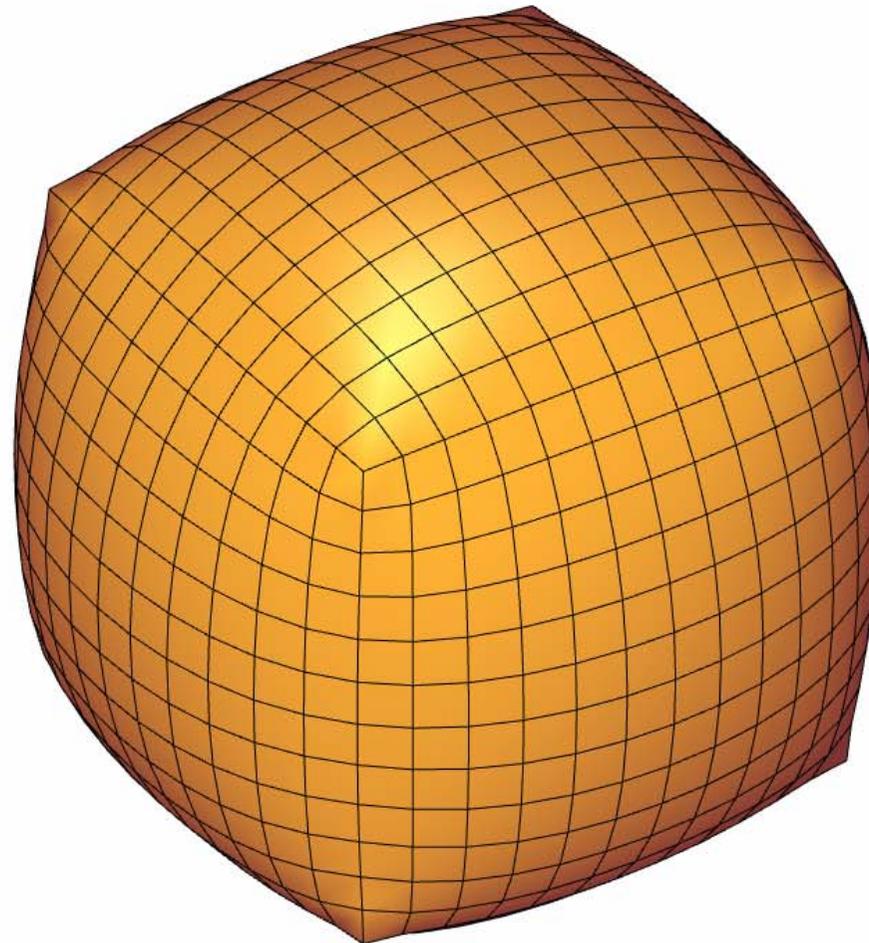
- Finden von Geodätischen Linien





# Aussichten:

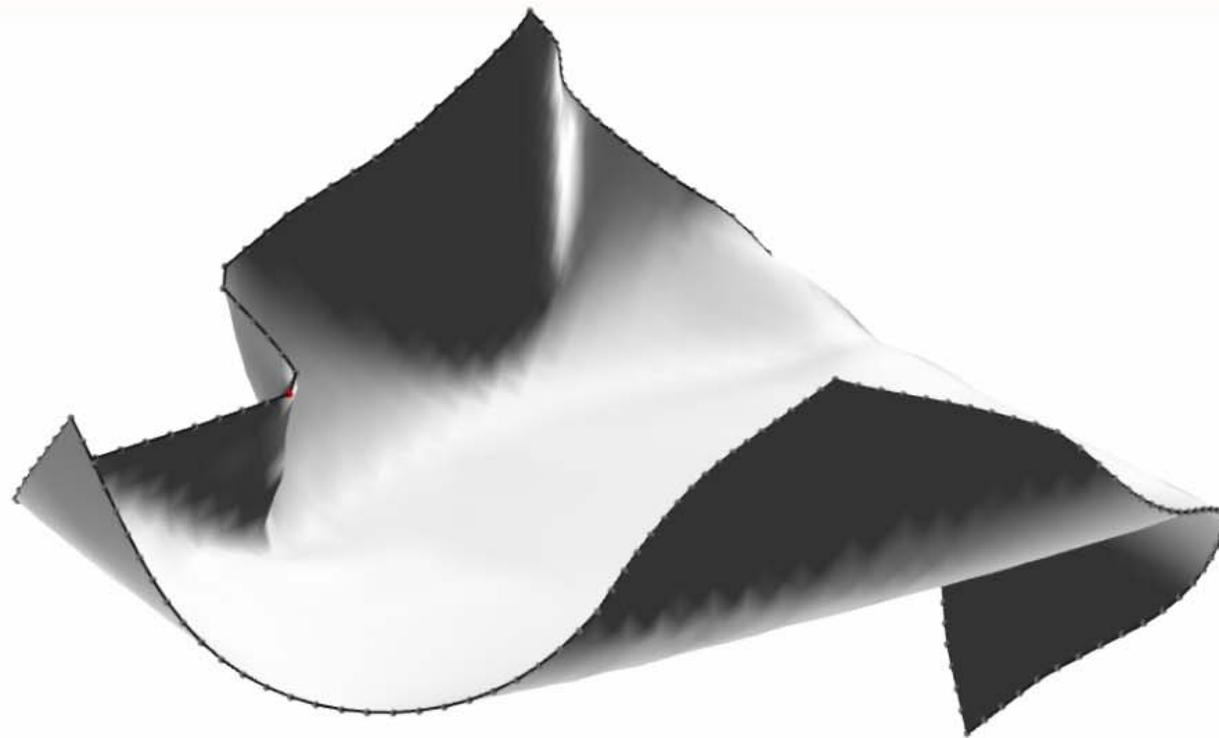
- Flächen unter Druck / CMC





# Aussichten:

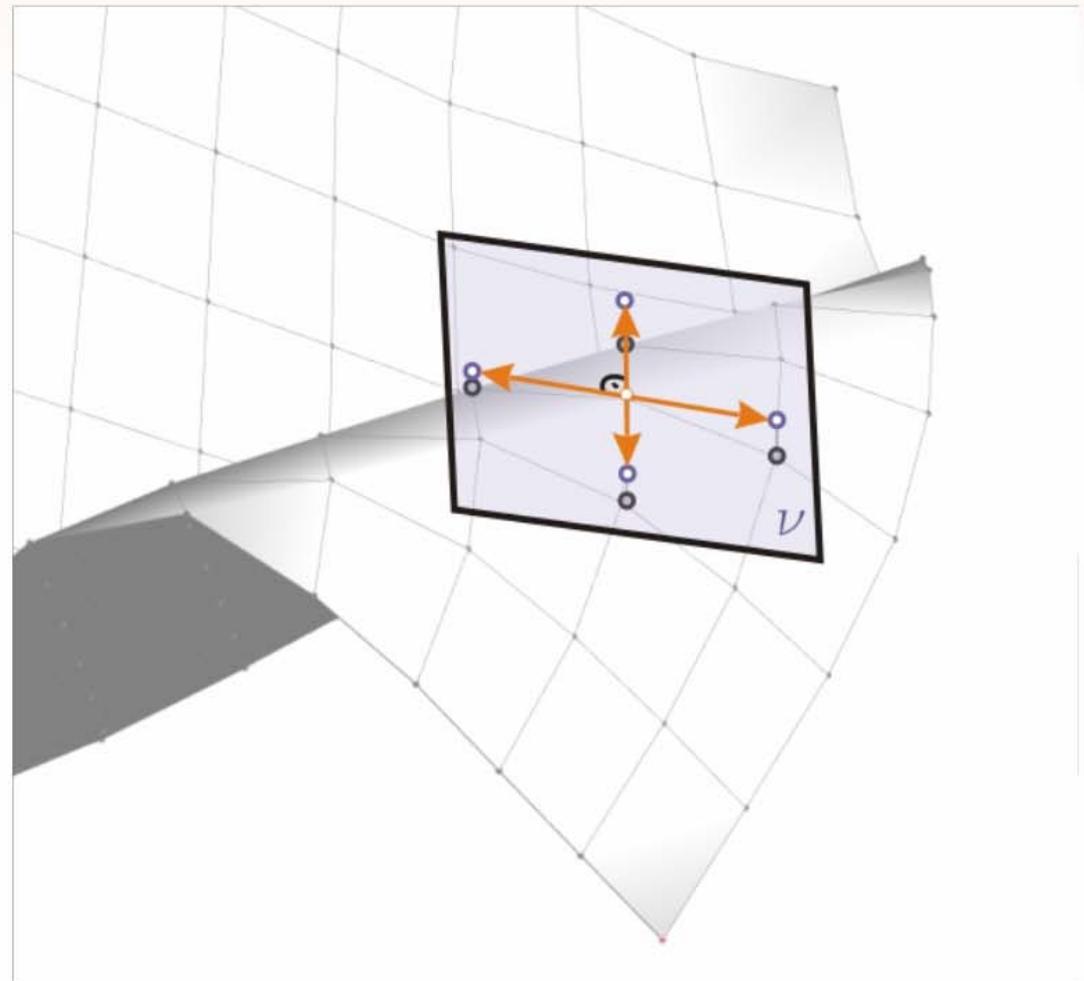
- Papier verformen





# Anwendungen:

- Idee: Winkel zwischen Tangenten konstant





Literatur:

Fruchterman / Reingold  
'Graph Design'

