

The background of the slide is a complex string art piece. It features a dense network of thin, intersecting lines in red and white, set against a dark, almost black, background. The lines are arranged in a way that creates a series of overlapping, curved, and somewhat star-like patterns radiating from a central point. The overall effect is one of intricate geometric complexity and organic growth.

String Art

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Herr Philipp

Kreis im Kreis

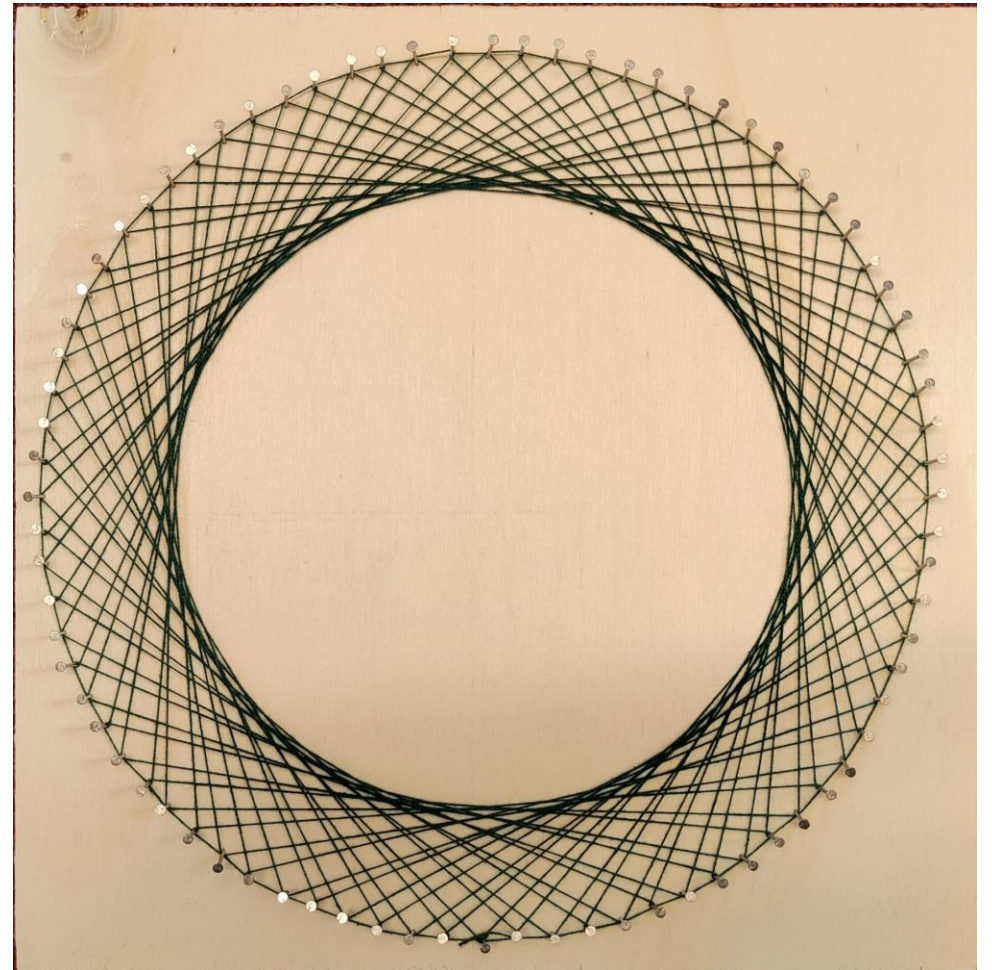
$$r = \cos\left(\frac{n\pi}{N}\right) \cdot R$$

r ... Fadenkreisradius

R ... Nagelkreisradius

n ... Sprungweite

N ... Gesamtanzahl der Nägel





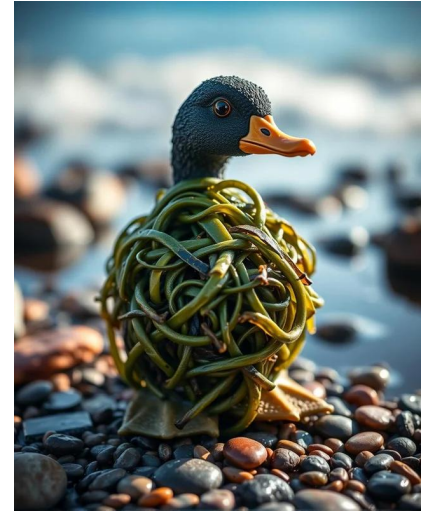
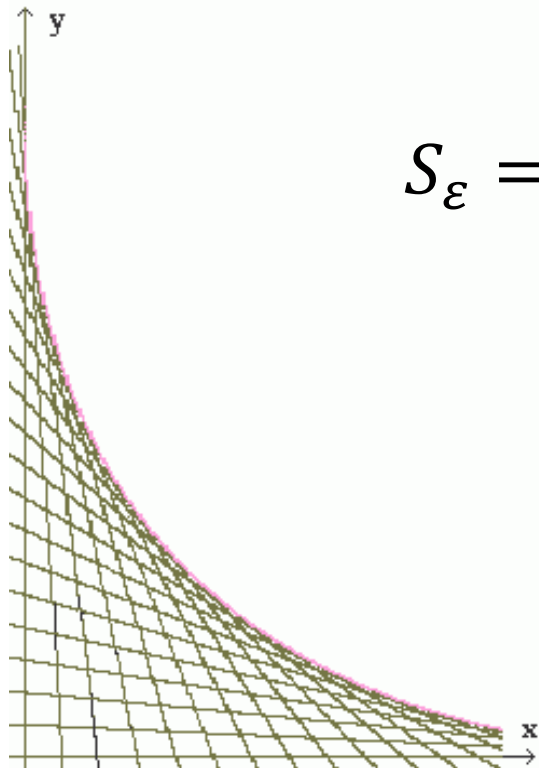
Tangente

$$y_1 = \frac{n-1}{n}x + 1 - n$$

$$y_2 = \frac{n+\varepsilon-1}{n+\varepsilon}x + 1 - n - \varepsilon$$

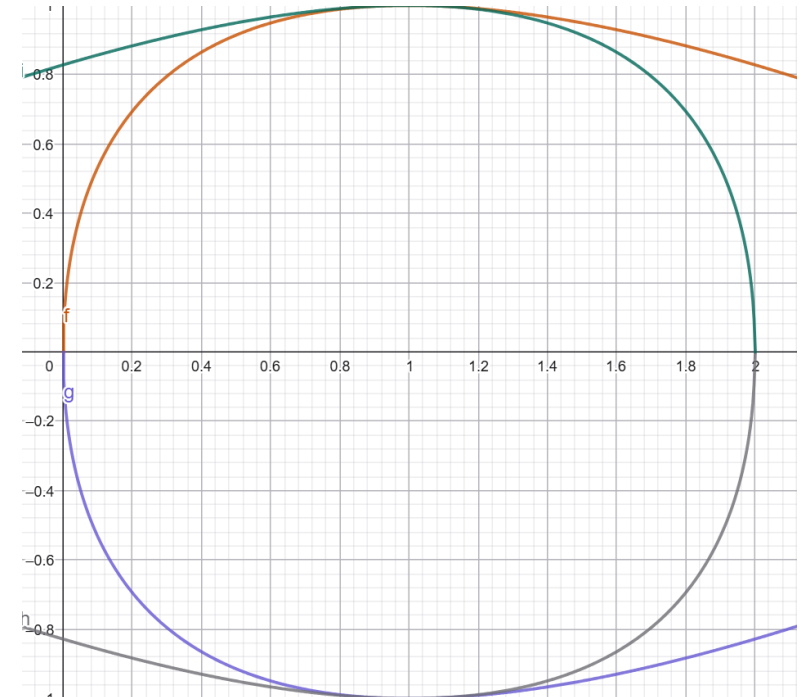
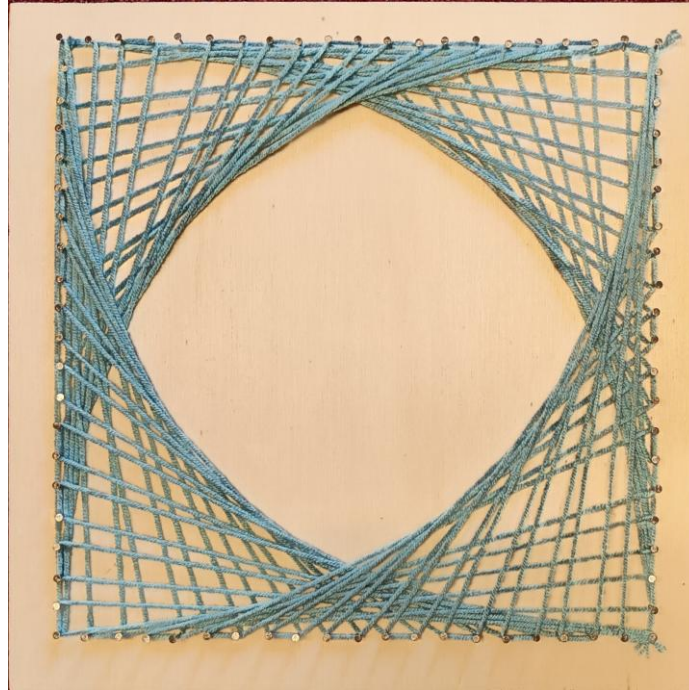
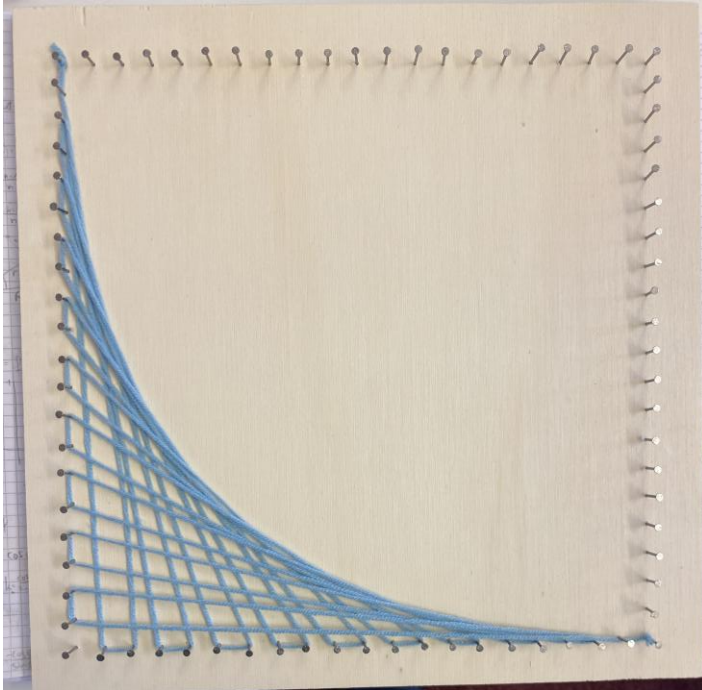
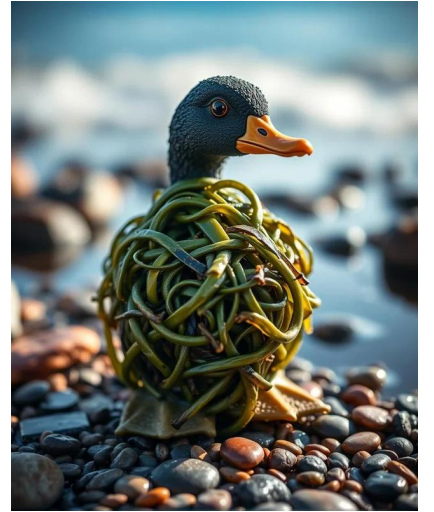
$$S_\varepsilon = \begin{pmatrix} n^2 - \varepsilon n \\ n^2 - \varepsilon n - 2n + \varepsilon + 1 \end{pmatrix} \xrightarrow{\varepsilon \rightarrow 0} S = \begin{pmatrix} n^2 \\ (n-1)^2 \end{pmatrix}$$

$$f(x) = (1 - \sqrt{x})^2$$



Tangente

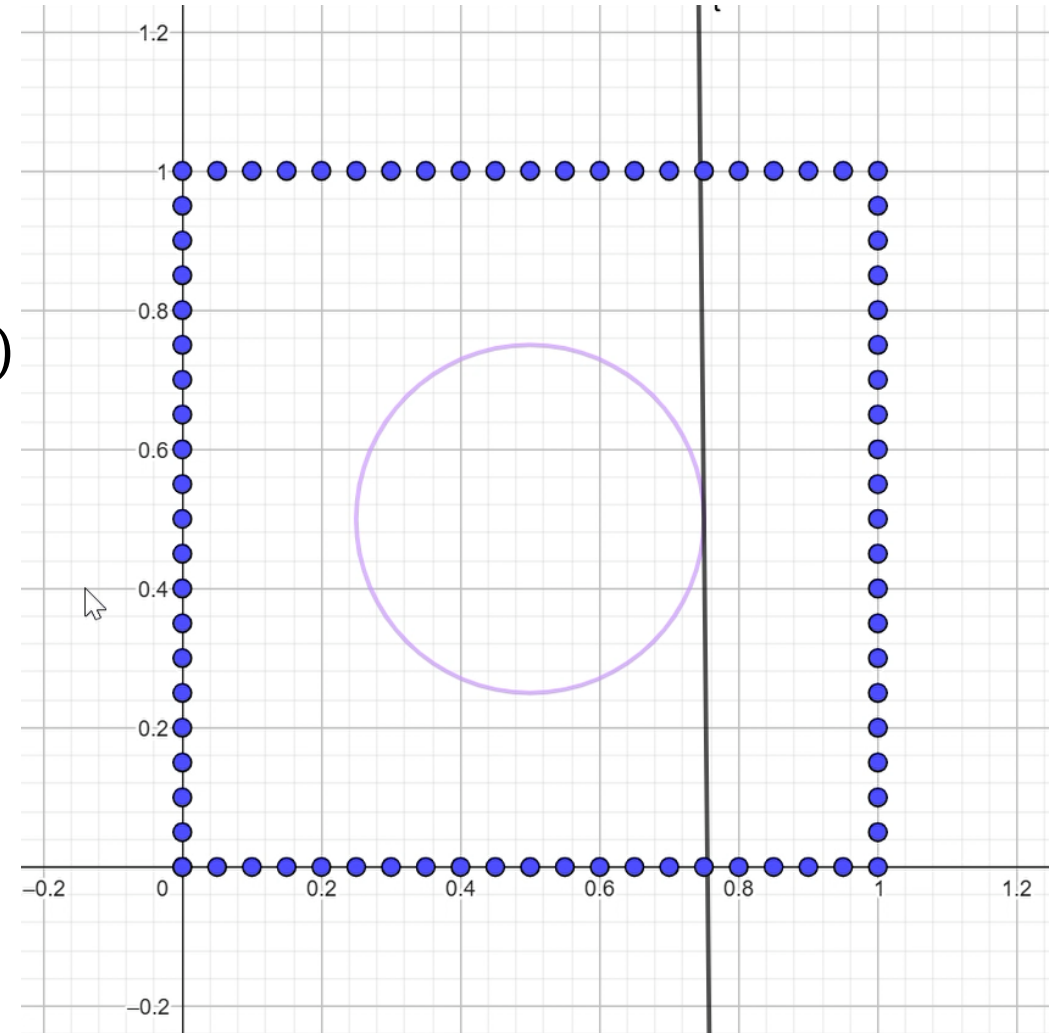
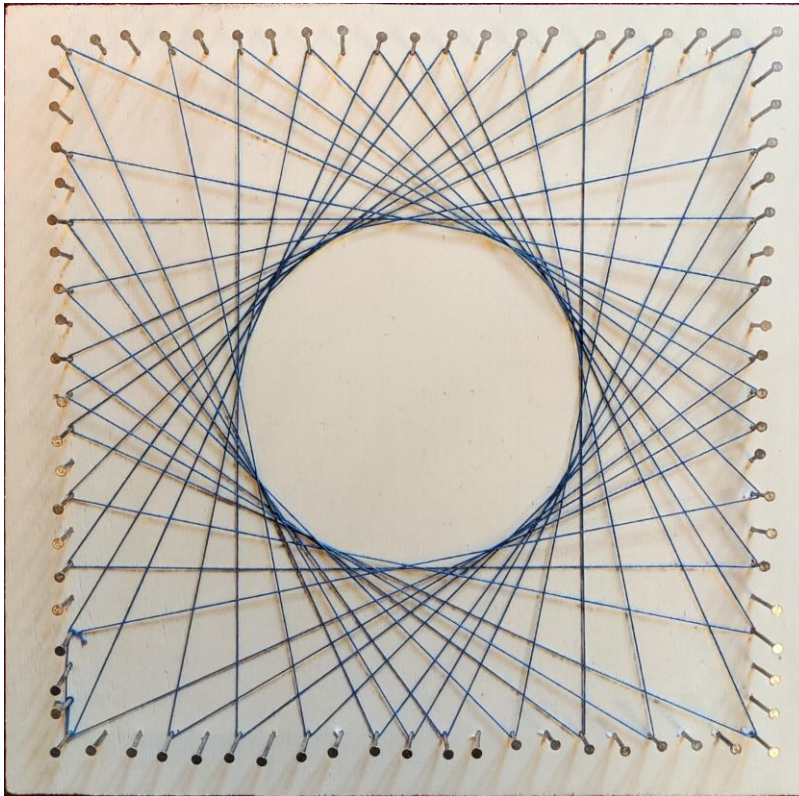
- Hüllkurve



Kreis im Quadrat

- Tangentengleichung

$$t:y = -\frac{\cos\alpha}{\sin\alpha}x + \frac{1}{2} + \frac{1}{4}\sin\alpha + \frac{\cos\alpha}{\sin\alpha}\left(\frac{1}{2} + \frac{1}{4}\cos\alpha\right)$$



Mathematische Def. eines Bildes

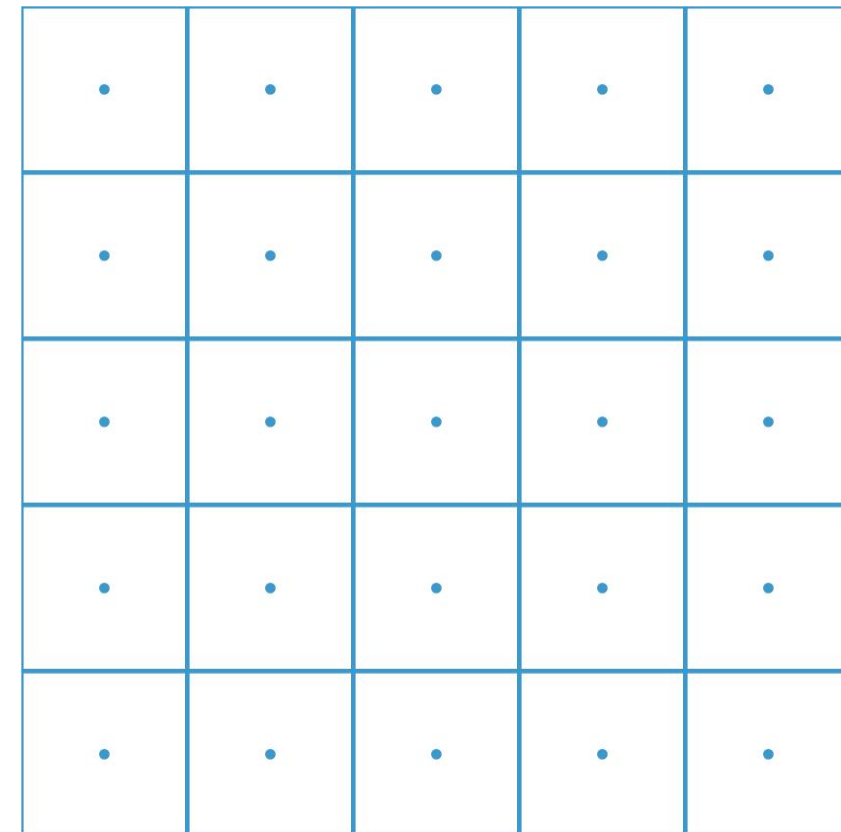
Jedem Pixel wird eine Zahl (Graustufe) zugeordnet

- Funktion

Graustufe: $B_G: \Omega \subseteq \mathbb{N}^2 \rightarrow [0,255]$

Farbe: $B_F: \Omega \subseteq \mathbb{N}^2 \rightarrow [0,255]^3$

- Darstellung durch Matrix



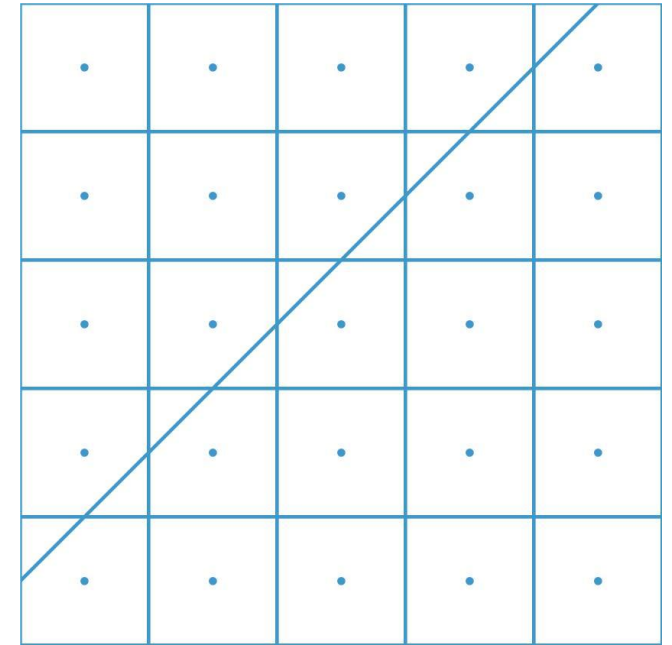
Darstellung Faden durch Matrix

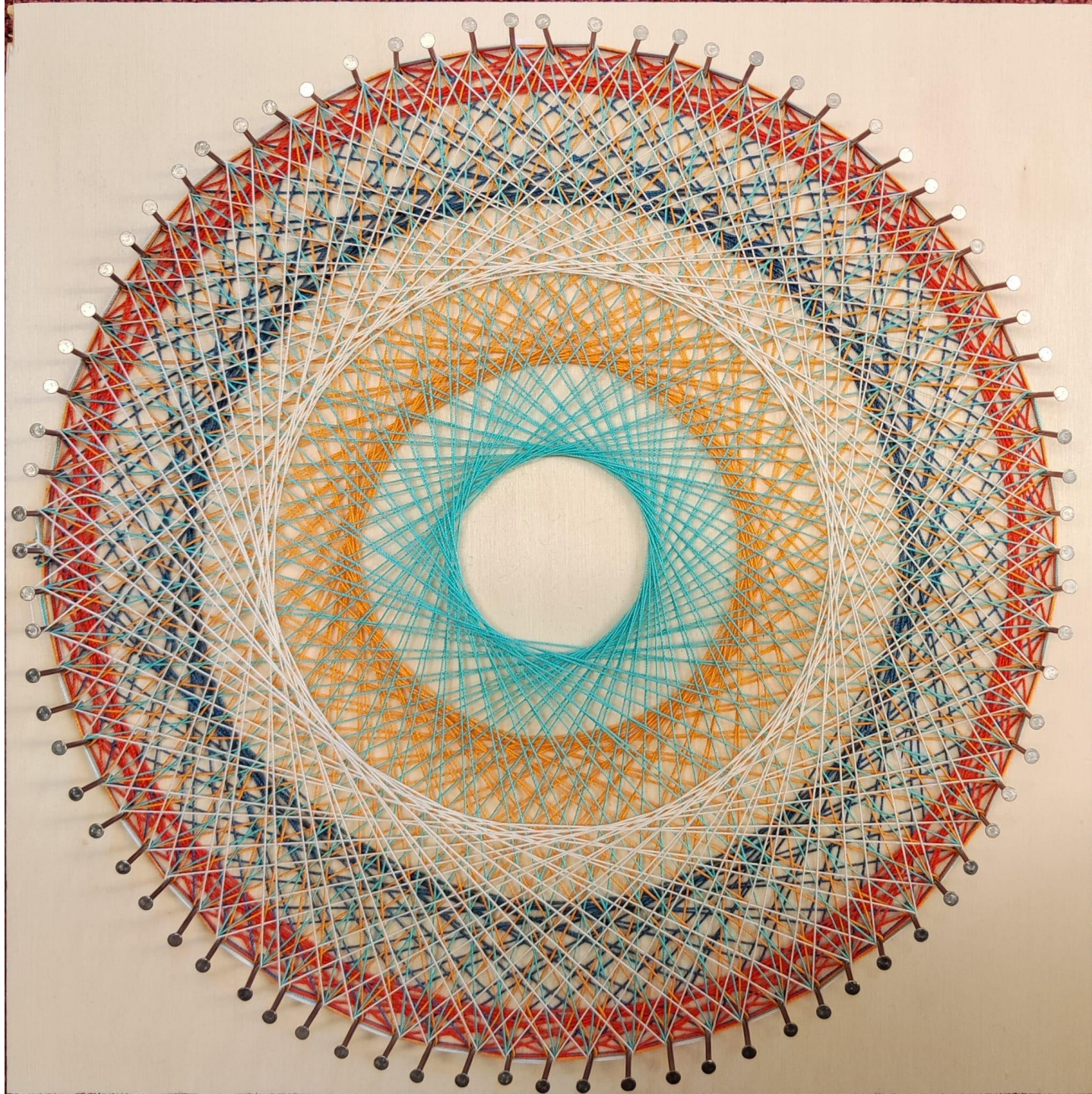
Jedem Pixel wird eine Zahl (Graustufe) zugeordnet

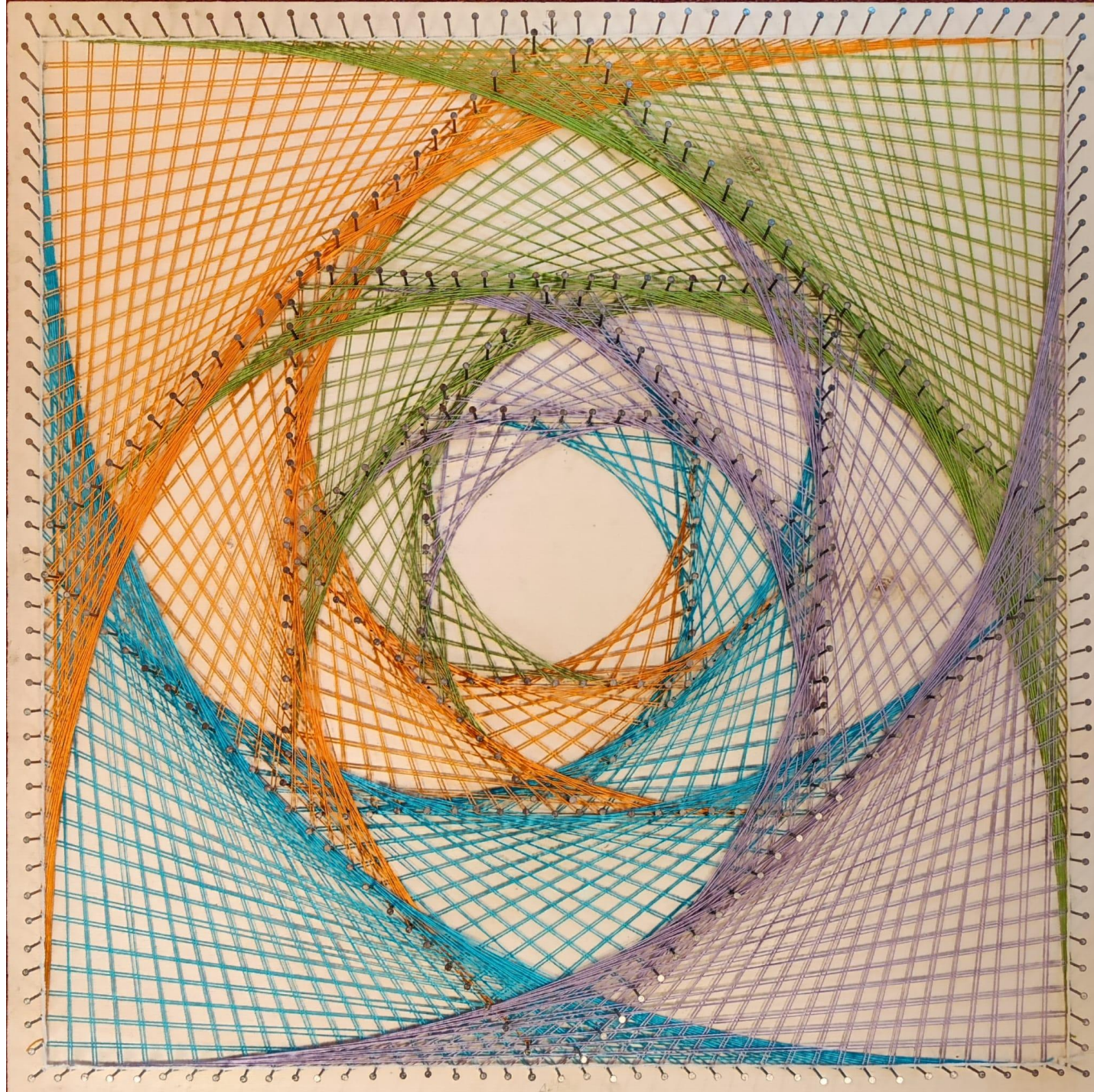
Faden + Faden + ... = Bild

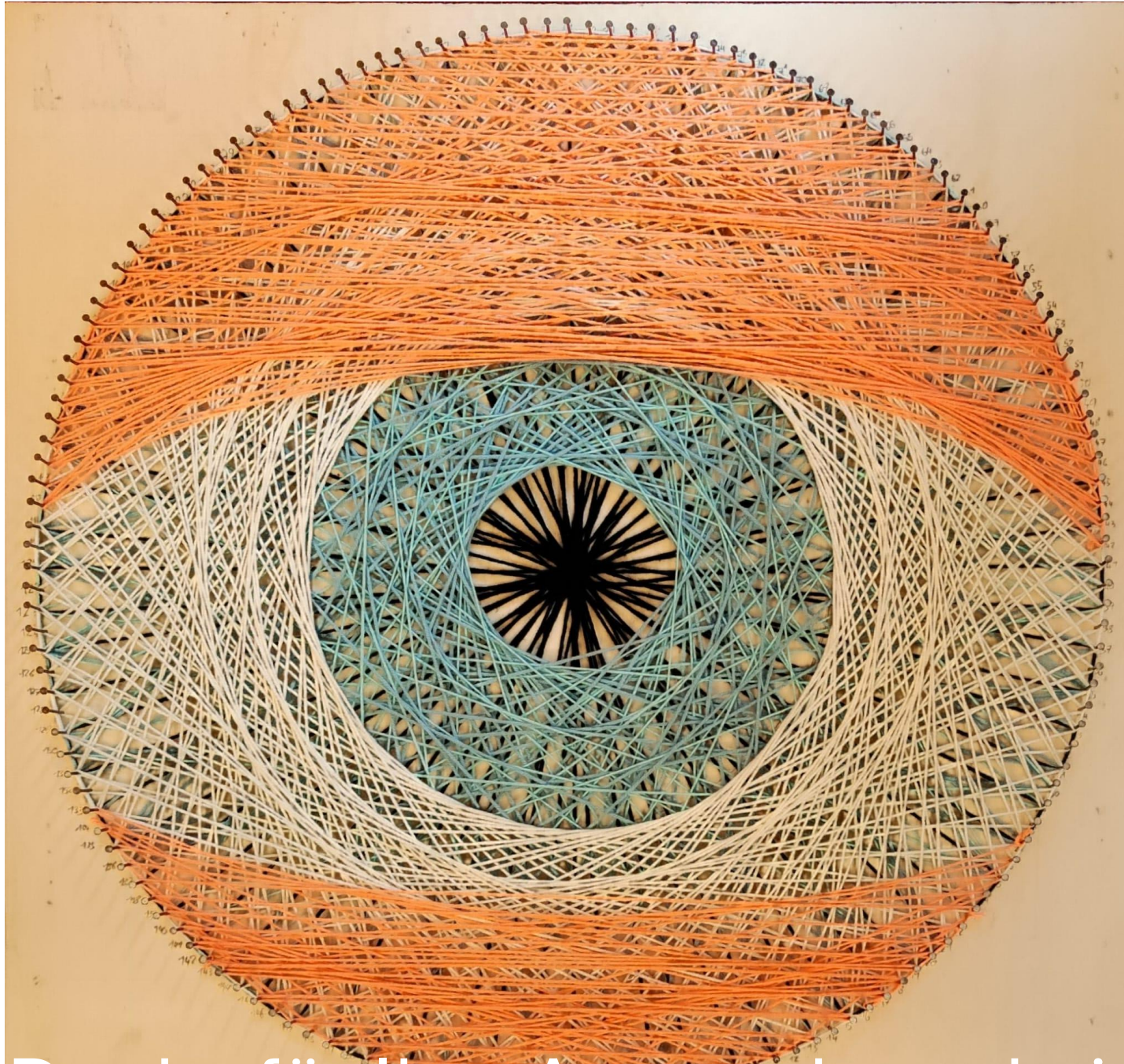
Bsp mit 4 Pixel:

$$\begin{pmatrix} 0 & 0.4 \\ 0.05 & 0.1 \end{pmatrix} + \begin{pmatrix} 0 & 0.3 \\ 0.2 & 0.1 \end{pmatrix} + \dots = \begin{pmatrix} 0.2 & 0.7 \\ 0.5 & 0.8 \end{pmatrix}$$









Danke für Ihre Aufmerksamkeit