

# TikZ ist kein Zeichenprogramm

Workshop TMU Kanti Freudenberg

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# Disclaimer

Ich bin kein Expert!

Mein Code könnte viel präziser und eleganter sein.

# Begründung

Als Mathelehrern müssen wir oft Grafiken, Bilder, usw erstellen.  
Welches Programm sollten wir verwenden?

Ich habe mir diese Fragen gestellt:

- ▶ *open source*? 😊
- ▶ für mein OS geeignet? 😊
- ▶ für mein Ziel geeignet? 😊
- ▶ Endprodukt ästhetisch ansprechend? 😊
- ▶ kompliziert zu lernen? 😊


Meine Lösung:

- ▶ 90% TikZ/PGF
- ▶ 10% Geogebra/SageMath/... (wenn ich keine Lust/Zeit habe)

# Ziele des Workshops

Sammlung von Bilder, die ich erstellt/gefunden habe, zur Verfügung stellen:

- ▶ als Ausgangslage für die, die TikZ/PGF benutzen möchten;
- ▶ als Beispiele/Ideen von was überhaupt mit TikZ/PGF machbar ist.

Material kann man hier  oder durch QR-code herunterladen.



# Vorteile und Nachteile

- 👍 Anpassen ist einfach (Massstab, Labels, ...)
  - 👍  $\LaTeX$ -friendly (File Grösse, Qualität, Fonts, ...)
  - 👍  $\LaTeX$ -beamer friendly (pause, ...)
- 
- 👎 Zeit- und Energieaufwändig
  - 👎 Für besondere Bilder es gibt bessere Programme

# Nützliche Links/Dokumente

Tutorial für Anfänger:

[!\[\]\(5eb1325dfdc3f1cad8426726c0db51cd\_img.jpg\)  \$\LaTeX\$ Graphics using TikZ \(overleaf\)](#)

[!\[\]\(eafc244b53721dd1ec133f0772f70fc7\_img.jpg\) PGF/TikZ - Graphics for  \$\LaTeX\$ \(Meik Hellmund\)](#)

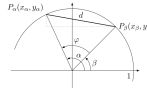
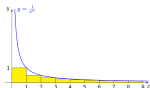
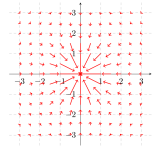
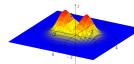
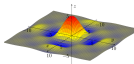
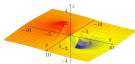
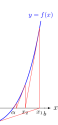
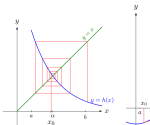
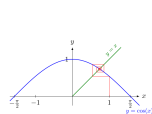
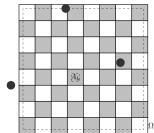
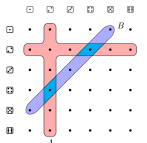
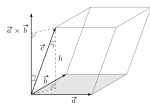
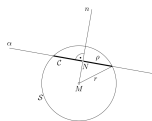
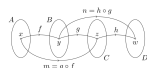
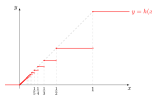
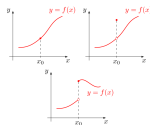
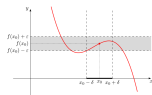
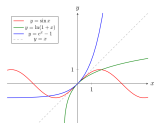
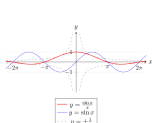
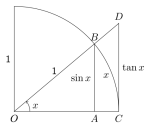
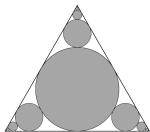
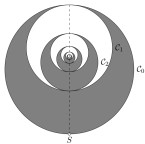
Beispiele:

[!\[\]\(950a62bbddad88d64435fd35607dfc42\_img.jpg\) https://tikz.dev/](https://tikz.dev/)

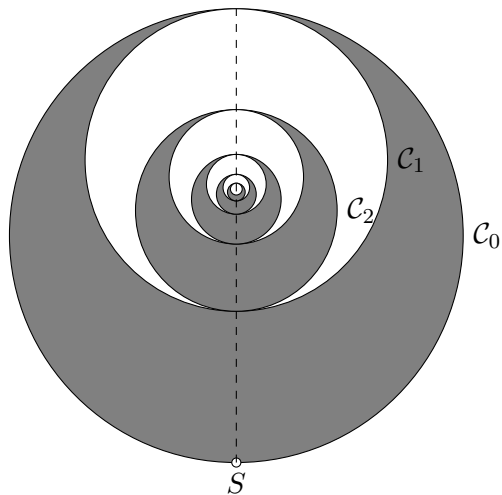
[!\[\]\(5a132f13505a6571904d622757b7a8f0\_img.jpg\) https://texample.net/tikz/](https://texample.net/tikz/)

Handbuch:

[!\[\]\(e1d6102fe77919492c04879c8450f1f5\_img.jpg\) TikZ & PGF Manual \(1322 Seiten\)](#)

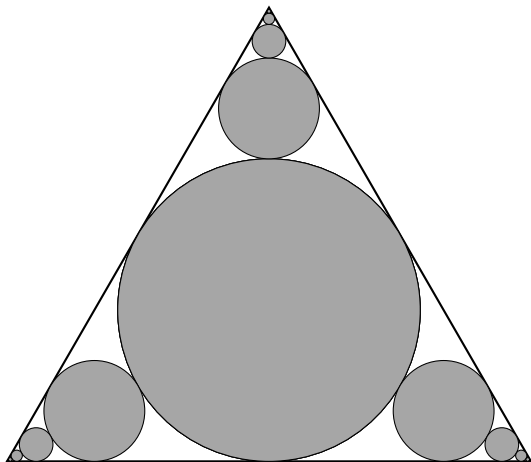


# Geometrische Reihe

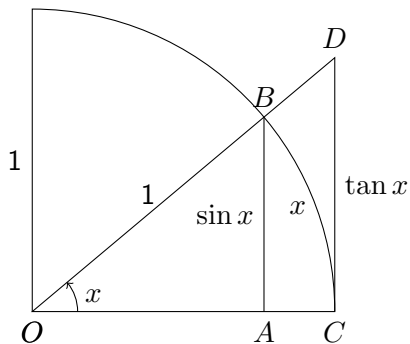




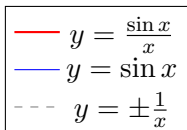
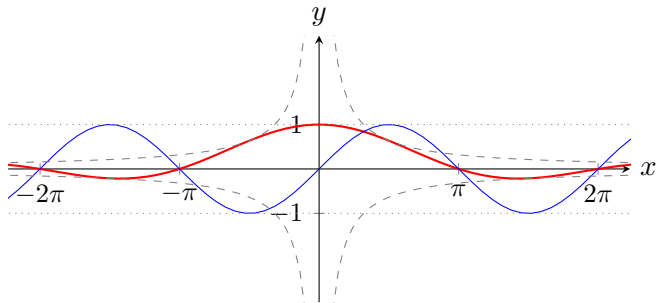
# Geometrische Reihe



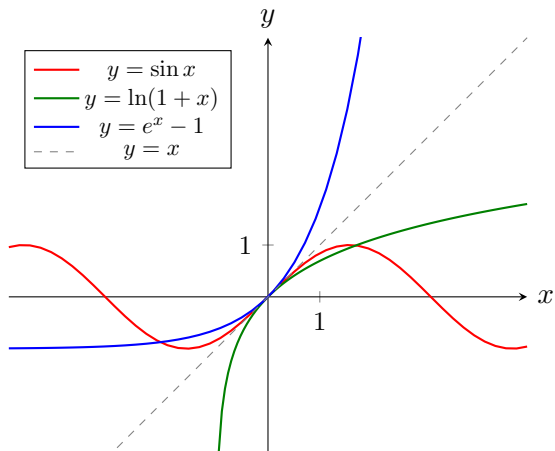
Beweis von  $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$



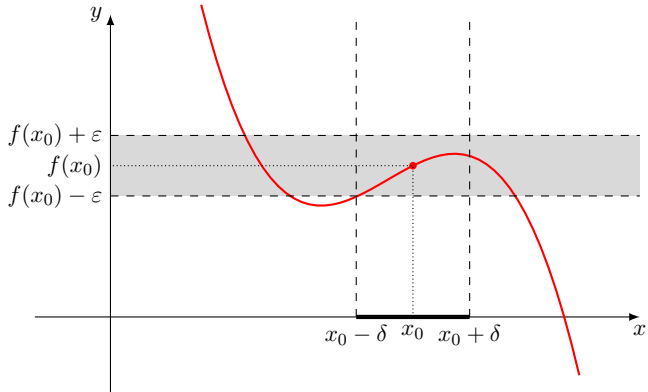
# Graph von $f(x) = \frac{\sin x}{x}$



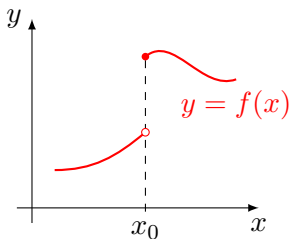
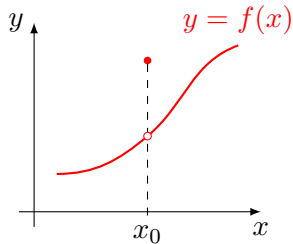
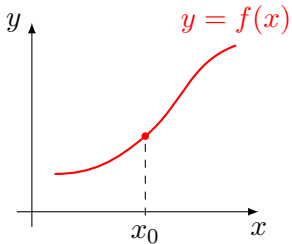
# Verhalten in der Nähe der Ursprung



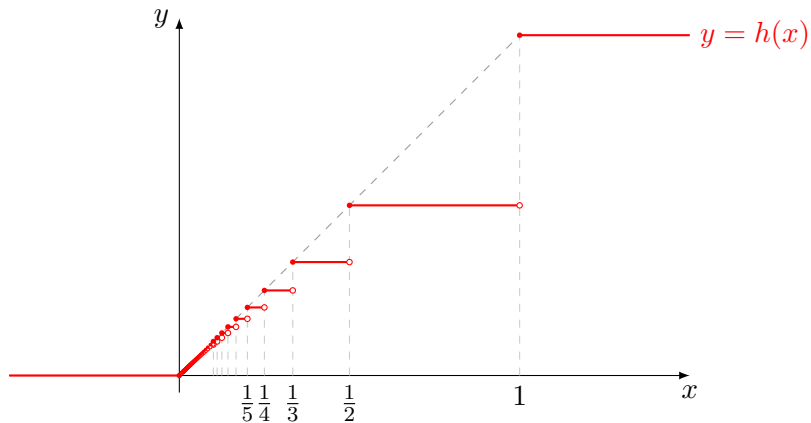
# Stetigkeit



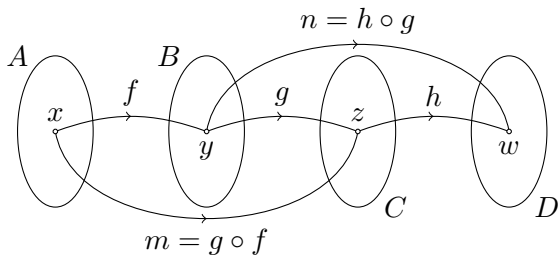
# Stetigkeit vs Unstetigkeit



## Beispiel: stetig in $x = 0$

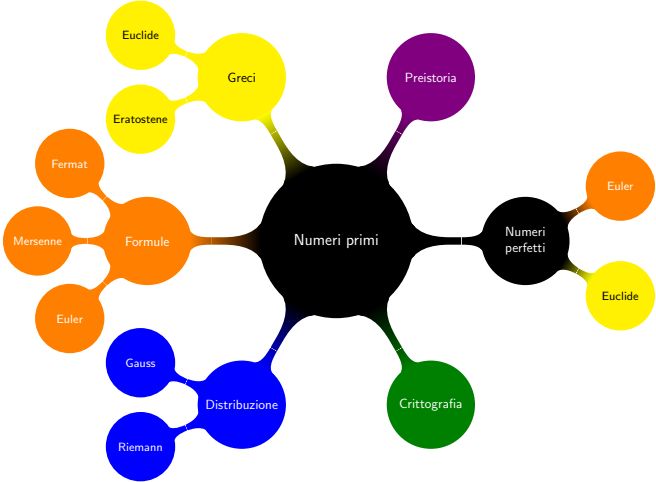


# Assoziativität der Komposition

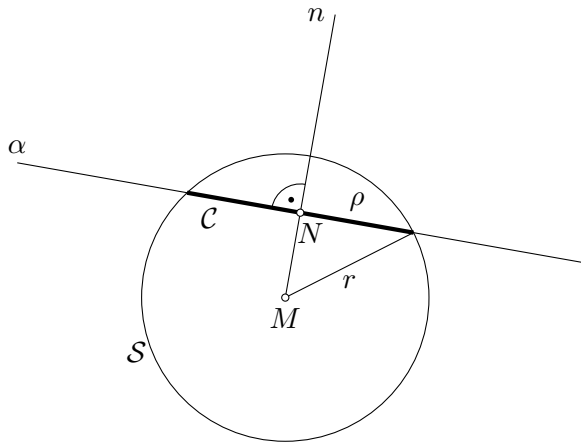




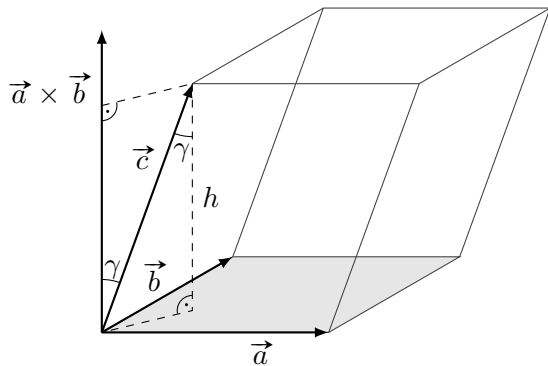
# Mindmap



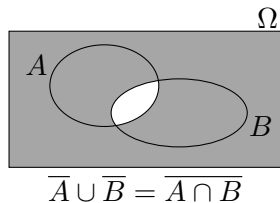
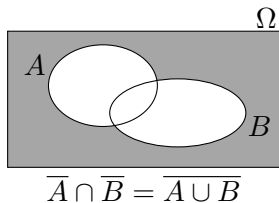
# Schnittkreis Kugel-Ebene



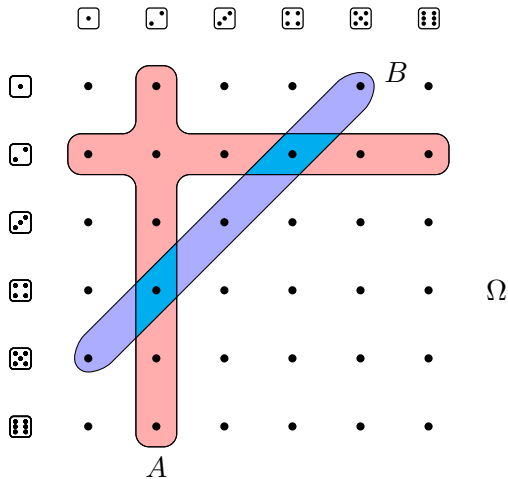
# Vektorprodukt



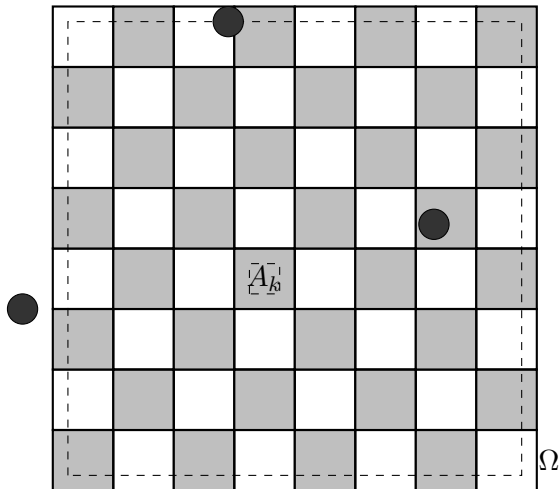
# De Morgan



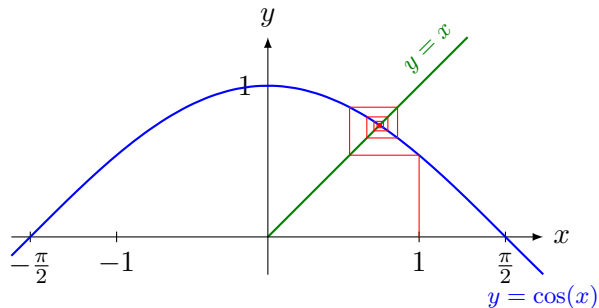
# Bedingte Wahrscheinlichkeit



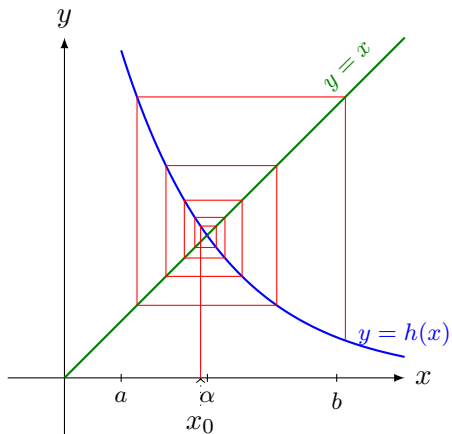
# Geometrische Wahrscheinlichkeit



# Fixpunktverfahren

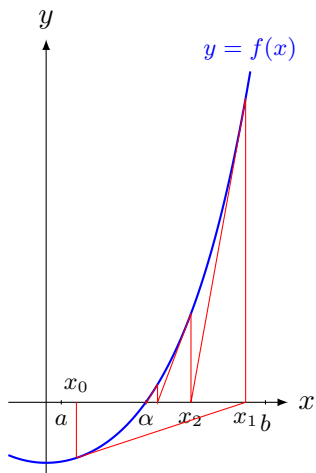


# Fixpunktverfahren

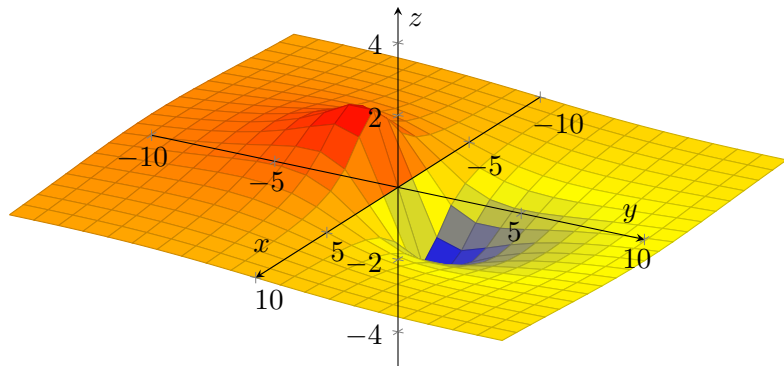




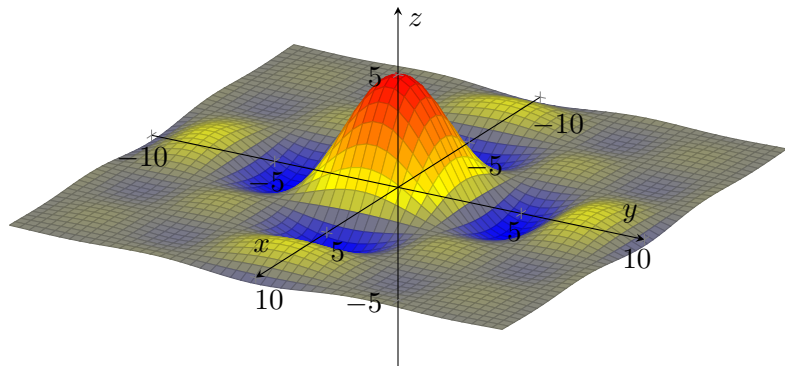
# Newton Verfahren



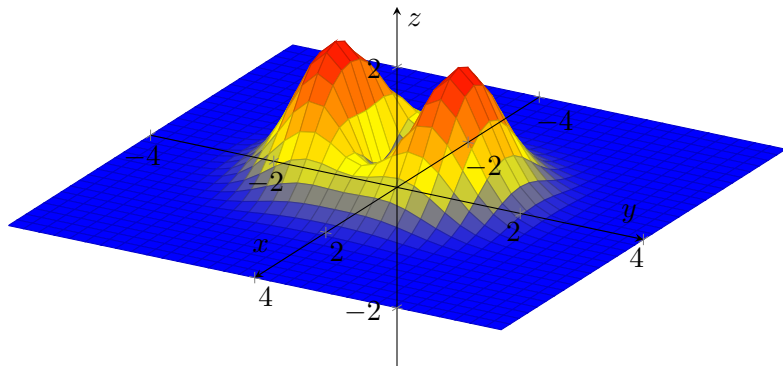
# Funktionen von zwei Variablen



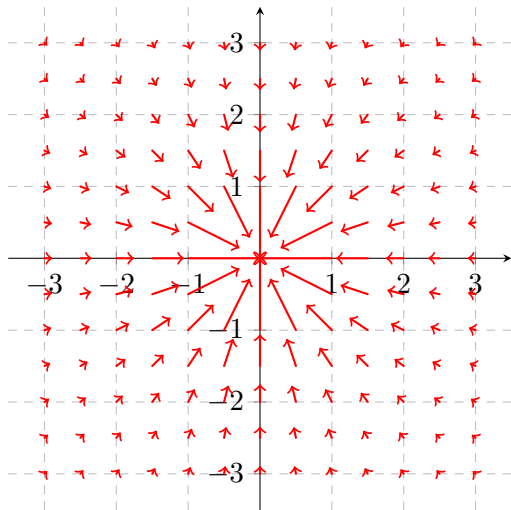
# Funktionen von zwei Variablen



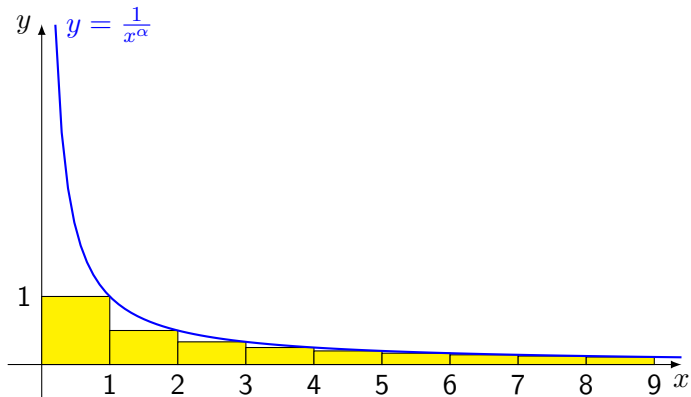
# Funktionen von zwei Variablen



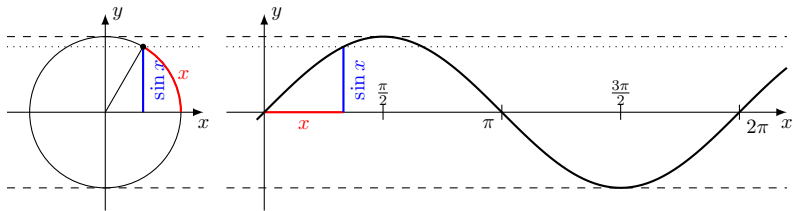
# Gradientenfeld



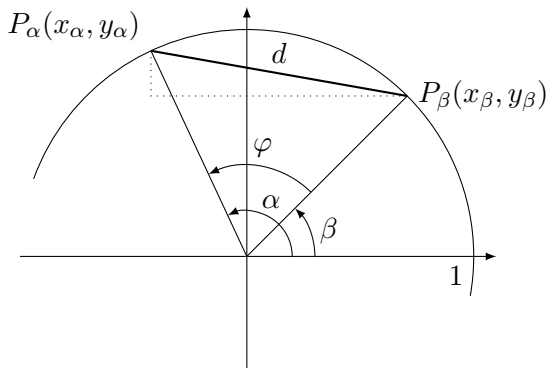
# Integralkriterium



# Graph von $\sin$



# Additionstheoreme





# Sieb des Eratosthenes

