

NO DEJES SOLO A UN BIÓLOGO CON LAS MATEMÁTICAS

Fisquito de matemáticas 04.05.2017

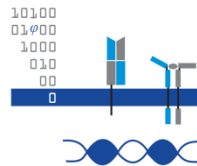
Guido Santos Rosales: Guido.Santos-Rosales@uk-erlangen.de

Laboratory of Systems Tumor Immunology
Universitätsklinikum Erlangen



FRIEDRICH-ALEXANDER
UNIVERSITÄT
ERLANGEN-NÜRNBERG
MEDIZINISCHE FAKULTÄT

1



Systems
Tumor
Immunology

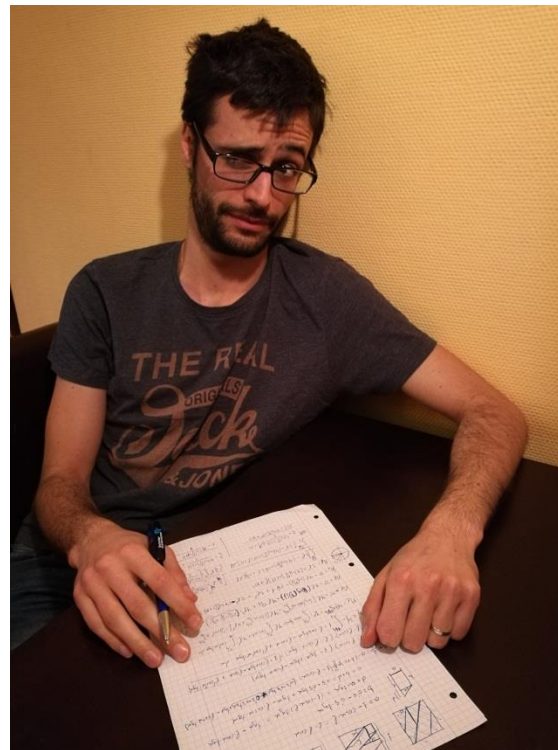
Universitätsklinikum
Erlangen





Lógica conjuntista, topología y cardinalidad

Prof. Josué Remedios Gómez



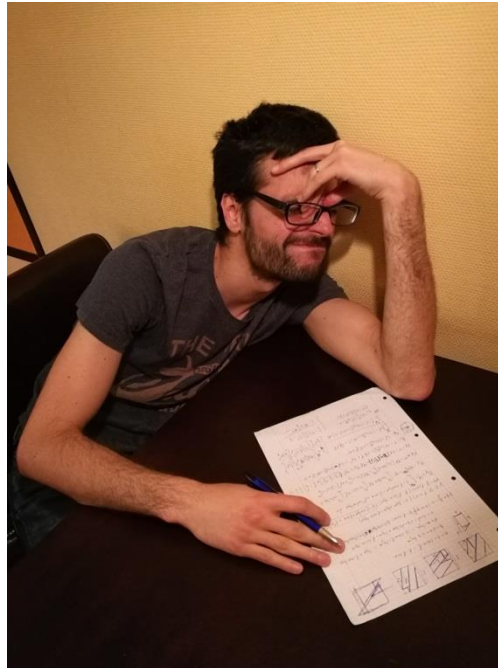
Behauptung: Die Funktion f mit $f(x) = 2x - 1$ besitzt im Intervall $[0, 1]$ mindestens eine Nullstelle x_0 .

Konstruktiver Beweis: Sei $x_0 = 0,5$. Dann gilt $f(x_0) = 2x_0 - 1 = 2 \cdot 0,5 - 1 = 1 - 1 = 0$.

Ferner liegt $x_0 = 0,5$ im Intervall $[0, 1]$.

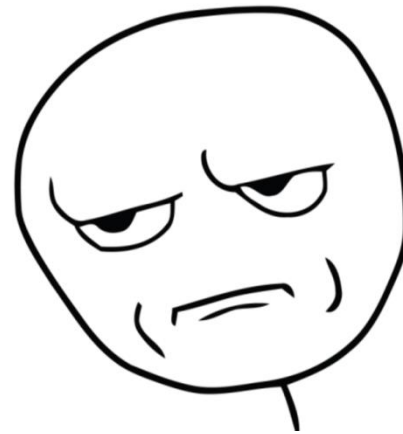
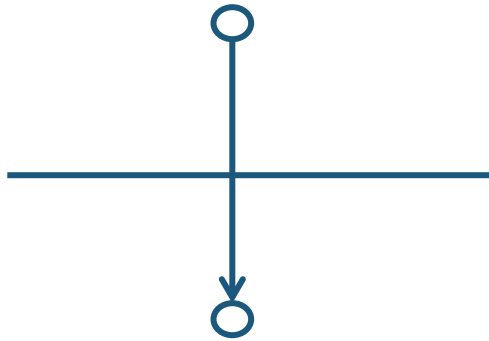
Damit ist die Behauptung bewiesen.

Die Nullstelle ist sogar mit $x_0 = 0,5$ angegeben.

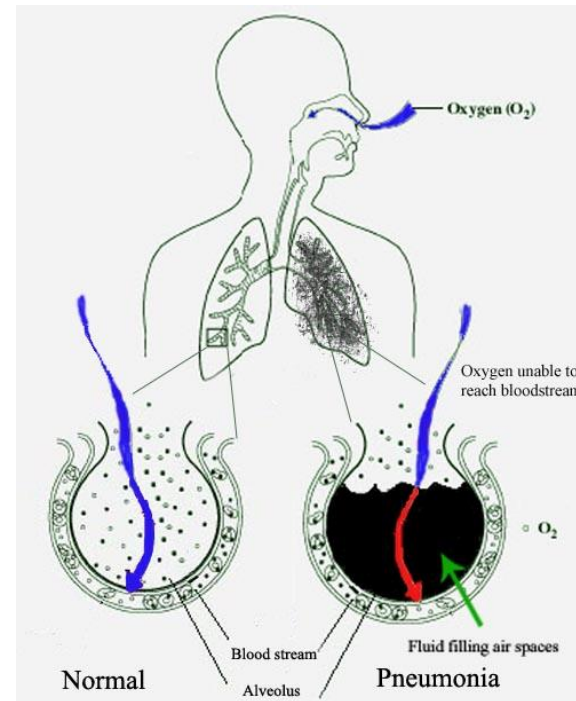


Teorema de Bolzano

Sea f una función continua en un intervalo $[a, b]$. Entonces para cada u tal que $f(a) < u < f(b)$, existe al menos un c dentro de (a, b) tal que $f(c) = u$.



NEUMONÍA



$\forall p \in \text{people} \exists b \in \text{bacteria} \mid f(p, b) \rightarrow \text{pneumonia}$

$$\begin{pmatrix} 1 & 5 & 3 \\ 2 & 6 & 9 \\ 4 & 5 & 4 \end{pmatrix}$$

Álgebra

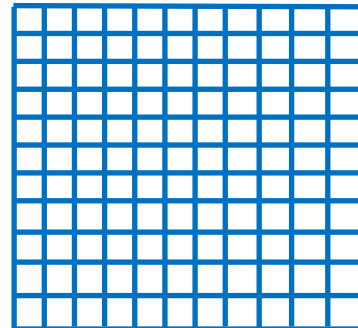
Grupos,
anillos,
campos...

Autovalores, autovectores



OK... elementos muy bien ordenados en dos dimensiones

$$\begin{pmatrix} 1 & 5 & 3 \\ 2 & 6 & 9 \\ 4 & 5 & 4 \end{pmatrix}$$

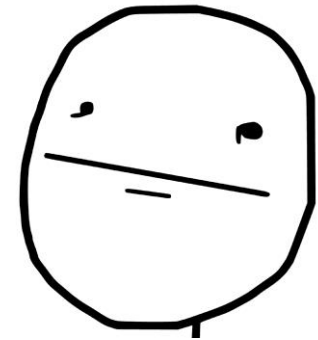


Cálculo infinitesimal

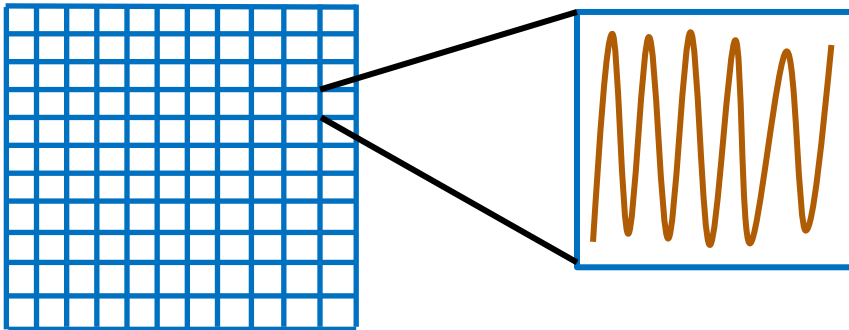
$$\frac{dx}{dt} = f(x, t)$$

$$\int e^{-it} dt$$

$$\lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$



Ehm... para ver cosas que se mueven rápido



$$\frac{dx}{dt} = f(x, t)$$

Crecimiento exponencial

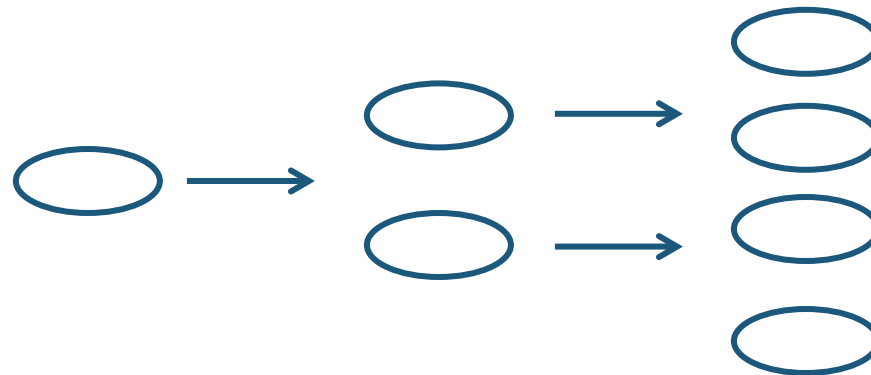
...

$$e = 2,71828\dots$$

$$M_t = M_0 \cdot e^{rt}$$

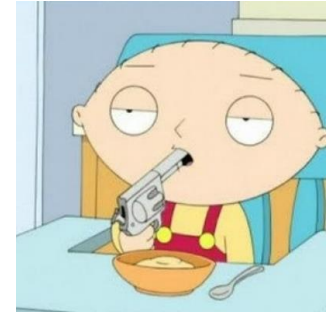
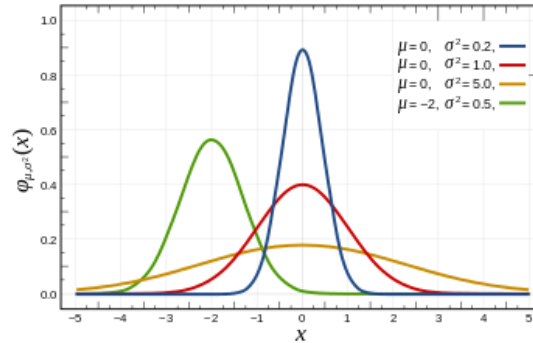


Crecimiento de las bacterias

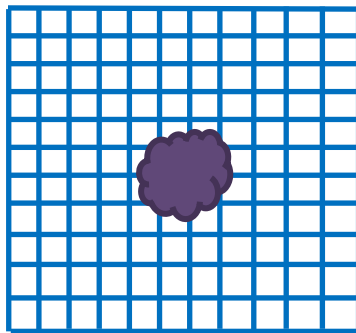


Estadística

$$f_{\mu, \sigma^2}(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$



...para cosas aleatorias



$$f_{\mu, \sigma^2}(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

