(34) g cont $[0,1]$

$g(x)=\frac{x^2+x}{x}$ $\quad 0<x\leq 1$

$g(0)=\lim_{x\to 0} g(x)$

$=\lim_{x\to 0}\frac{x^2+x}{x}\ \frac{0}{0}\ \lim_{x\to 0}\frac{\cancel{x}(x+1)}{\cancel{x}}=1$

ene 14-14:07

(35) $f(x)=\begin{cases}\frac{x-4}{4} & 0\leq x\leq 1/2\\ e^{-x^2} & \frac{1}{2}<x\leq 1\end{cases}$

$f(0)=-1<0$

$f(1)=e^{-1}>0$

$\nexists\, c\in(0,1) \ni f(c)=0$

$\left.\begin{array}{l}f \text{ cont } [0,1]\\ \text{sig } f(0)\neq \text{sig } f(1)\end{array}\right] \Rightarrow \exists\, c\in(0,1)\ni f(c)=0$ NO

$\Rightarrow$ f no es cont en $[0,1]$

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f cont en $[0,1]-\{1/2\}$

En $x=1/2$

$\lim_{x\to 1/2} f(x)\begin{cases}\lim_{x\to 1/2^-}\frac{x-4}{4}=-7/8\\ \lim_{x\to 1/2^+} e^{-x^2}=\frac{1}{\sqrt[4]{e}}\end{cases}$

$f(1/2)=\frac{7}{8}$

DIS. 1ª ESP

NO CONTRADICE BOLZANO

porque no se cumple la 1ª hipótesis

que f sea cont en $[0,1]$

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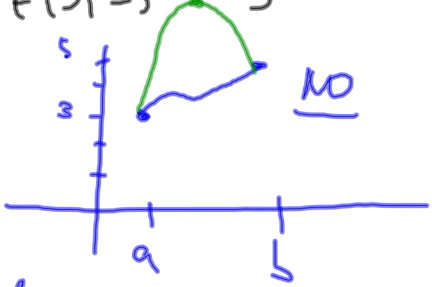
T^a

hipótesis $\longrightarrow$ Tesis

(36)

$\left.\begin{array}{l}f \text{ cont } [a,b]\\ f(a)=3\\ f(b)=5\end{array}\right] \Rightarrow \exists\, c\in[a,b] \ni f(c)=7$



NO

No porque 7 no está entre 3 y 5

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(37)

$\left.\begin{array}{l} f \\ g \end{array}\right\}$ NO CONT. EN x_0

$f+g$ cont en x_0

$$\left.\begin{array}{l} f(x)=\dfrac{1}{x-1} \\ g(x)=\dfrac{1}{(x^2-1)^2} \end{array}\right\} \quad f+g(x)=\frac{1}{x-1}+\frac{1}{(x-1)^2}$$

$$\frac{x}{x^2-1}$$

$$f(x)=\begin{cases} 2 & x\leq 0 \\ 3 & x>0 \end{cases} \qquad g(x)=\begin{cases} -2 & x\leq 0 \\ -3 & x>0 \end{cases}$$

$$f+g(x)=\begin{cases} 0 & x\leq 0 \\ 0 & x>0 \end{cases} \qquad (f+g)(x)=0$$

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(39) $x^5+x+1=0$

$f(x)=x^5+x+1$

f cont en $\mathbb{R}$

$f(0)=1$

$f(-1)=-1$

$$\left.\begin{array}{l} f \text{ cont en } [-1,0] \\ \text{sig } f(-1)\neq \text{sig } f(0) \end{array}\right\} \overset{\text{BOLZANO}}{\Longrightarrow} \exists\, c\in(-1,0)$$

$\Rightarrow f(c)=0$

$\Rightarrow \exists\, c\in(-1,0)$ que es sol de la ec

$x^5+x+1=0$

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(40)

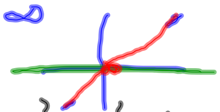
$a>0$

$ax^3+bx^2+cx+d=0$

$\lim_{x\to+\infty} = +\infty$

$\Rightarrow \exists$ al menos una sol.

$\lim_{x\to-\infty} = -\infty$

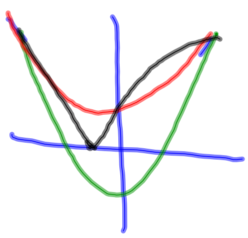


$ax^4+bx^3+cx^2+dx+e=0$

$a>0$

$\lim_{x\to+\infty} f(x)=+\infty$

$\lim_{x\to-\infty} f(x)=+\infty$



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