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Corto #5 Cálculo Multivariable (20 min)

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1. Analice si la función $\mathbf{r} = \langle 3e^{-t}, \ln(2t^2-1), \tan(2\pi) \rangle$ es continua en $t = 1$.

$$\lim_{t\to 1}(r) = \Big\langle \underbrace{\lim_{t\to 1}(3e^{-t})}_{f(t)}, \underbrace{\lim_{t\to 1}(\ln(2t^2-1))}_{g(t)}, \underbrace{\lim_{t\to 1}(\tan(2\pi))}_{h(t)} \Big\rangle$$

$$\lim_{t\to 1}(f(t)) = \frac{3}{e}$$

$$\lim_{t\to 1}(h(t)) = \tan(2\pi) = \frac{\sin(2\pi)}{\cos(2\pi)} \leftarrow 0$$

r(1)

$$= 0$$

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$$\lim_{t\to 1}(f(t)) = \ln(2(1)^2 - 1)$$
$$= \ln(2-1)$$
$$= \ln(1)$$
$$= 0$$

Sí es continua en $t=1$ $\left\langle \frac{3}{e}, 0, 0 \right\rangle$

2. Encuentre la ec. de la recta tangente a $\mathbf{r}(t) = \left\langle te^{t-1}, \frac{8}{\pi}\arctan(t), 2\ln(t) \right\rangle$ en $t = 1$.

$$\vec{r}_T = \vec{r}(a) + t\,\vec{r}\,'(a)$$

$$\vec{r}(1) = \Big\langle 1 \cdot e^{(1-1)}, \frac{8}{\pi}\underbrace{\arctan(1)}_{\frac{\pi}{4}}, 2\underbrace{\ln(1)}_{0} \Big\rangle$$

$$\frac{\sin(\pi/4)}{\cos(\pi/4)} = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} =$$

$$= \left\langle 1, \frac{8}{\pi}\cdot\frac{\pi}{4}, 0 \right\rangle$$

$$= \langle 1, 2, 0 \rangle$$

$$\boxed{\vec{r}_T(1) = \langle 1, 2, 0 \rangle + t\left\langle 2, \frac{4}{\pi}, 2 \right\rangle}$$

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$$\vec{r}\,'(t) = \left\langle \left(e^{t-1} + te^{t-1}\cdot 1\right), \left(\frac{8}{\pi}\cdot\frac{1}{t^2+1}\right), \left(\frac{2}{t}\right) \right\rangle$$

$$\vec{r}\,'(t) = \left\langle e^{t-1} + te^{t-1}, \frac{8}{\pi(t^2+1)}, \frac{2}{t} \right\rangle$$

$$\vec{r}\,'(1) = \left\langle e^0 + 1\cdot e^0, \frac{8}{\pi(1+1)}, \frac{2}{1} \right\rangle = \left\langle 1+1, \frac{8}{2\pi}, 2 \right\rangle$$

$$= \left\langle 2, \frac{4}{\pi}, 2 \right\rangle$$