

PROBLEMA 10.11

$$F(x) = \int_0^x t^2 \cos(t^2) dt$$

Taylor $x_0 = 0$; orden 3

$$\text{Usamos: } \cos(t^2) = 1 - \frac{t^4}{2!} + \frac{t^6}{3!} + \dots$$

$$t^2 \cos(t^2) = t^2 - \frac{t^6}{2!} + \frac{t^8}{3!} + \dots$$

$$\begin{aligned} \Rightarrow \int_0^x t^2 \cos(t^2) dt &= \int_0^x \left(t^2 - \frac{t^6}{2!} + \frac{t^8}{3!} + \dots \right) dt \\ &= \frac{x^3}{3} - \frac{x^7}{14} + \frac{x^9}{54} + o(x^9) \end{aligned}$$

$$\boxed{P_3(x | F, x_0 = 0) = \frac{x^3}{3}}$$

Calcula $\lim_{x \rightarrow 0} \frac{F(x)}{x^3}$

$$\lim_{x \rightarrow 0} \frac{F(x)}{x^3} = \lim_{x \rightarrow 0} \frac{\frac{x^3}{3} - \frac{x^7}{14} + o(x^7)}{x^3} = \frac{1}{3} //$$