

↓ PRIIMEK ↓	↓ IME ↓	↓ VPISNA ŠTEVILKA ↓	↓ SMER ↓

Poiščite ekstreme funkcije $f(x) = x^2 e^{-x^2}$!

Stacionarne točke:

$$f'(x) = 2xe^{-x^2} + x^2 e^{-x^2} \cdot (-2x) = 2xe^{-x^2} (1 - x^2) = 2xe^{-x^2} (1 - x)(1 + x) = 0$$

$$x_1 = 0$$

$$x_2 = 1$$

$$x_3 = -1$$

Potrditev ekstremov:

$$\begin{aligned} f''(x) &= (2xe^{-x^2} - 2x^3 e^{-x^2})' \\ &= 2e^{-x^2} + 2xe^{-x^2} \cdot (-2x) - 6x^2 e^{-x^2} - 2x^3 e^{-x^2} \cdot (-2x) \\ &= 2e^{-x^2} (1 - 5x^2 + 2x^4) \end{aligned}$$

$$f''(0) = 2e^0 = 2 > 0 \quad \Rightarrow \quad T_1(0,0) \text{ je min}$$

$$f''(1) = 2e^{-1} \cdot (-2) = -4e^{-1} < 0 \quad \Rightarrow \quad T_2(1, \frac{1}{e}) \text{ je max}$$

$$f''(-1) = 2e^{-1} \cdot (-2) = -4e^{-1} < 0 \quad \Rightarrow \quad T_3(-1, \frac{1}{e}) \text{ je max}$$