

Determinare i max e min della funzione

$$z = x^2 y e^{x+y}$$

$$\begin{cases} 2xy e^{x+y} + x^2 y e^{x+y} = 0 \\ x^2 e^{x+y} + x^2 y e^{x+y} = 0 \end{cases} \quad \begin{cases} xy(2+x) = 0 \\ x^2(y+1) = 0 \end{cases} \quad \begin{matrix} x=0 \\ y=0 \\ x=-2 \end{matrix}$$

$$\begin{cases} x=0 \\ \forall y \end{cases} P(0, y) \quad \vee \quad \begin{cases} y=0 \\ x=0 \end{cases} \quad \vee \quad \begin{cases} x=-2 \\ y=-1 \end{cases} \quad \text{PUNTI CRITICI} \quad 0(0,0) \quad P(-2,-1)$$

$$f_{xx} = 2y e^{x+y} + 2xy e^{x+y} + 2xy e^{x+y} + x^2 y e^{x+y} = e^{x+y} (2y + 4xy + x^2 y) \quad Q(0, y) \text{ (asse } y)$$

$$f_{yy} = x^2 e^{x+y} + x^2 e^{x+y} + x^2 y e^{x+y} = e^{x+y} (2x^2 + x^2 y)$$

$$f_{xy} = 2x e^{x+y} + 2xy e^{x+y} + x^2 e^{x+y} + x^2 y e^{x+y} = e^{x+y} (2x + 2xy + x^2 + x^2 y)$$

$$H(0,0) = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix} = 0 \quad \text{NULLA SI PUÒ DIRE}$$

$$H(-2,-1) = \begin{pmatrix} e^{-3}(-2+8-4) & e^{-3}(-4+4+4-4) \\ 0 & e^{-3}(8-4) \end{pmatrix} = \begin{pmatrix} 2e^{-3} & 0 \\ 0 & 2e^{-3} \end{pmatrix} > 0$$

$f_{xx} > 0$

$$H(0,y) = \begin{pmatrix} 2ye^y & 0 \\ 0 & 0 \end{pmatrix} = 0 \quad \text{NULLA SI PUÒ DIRE}$$

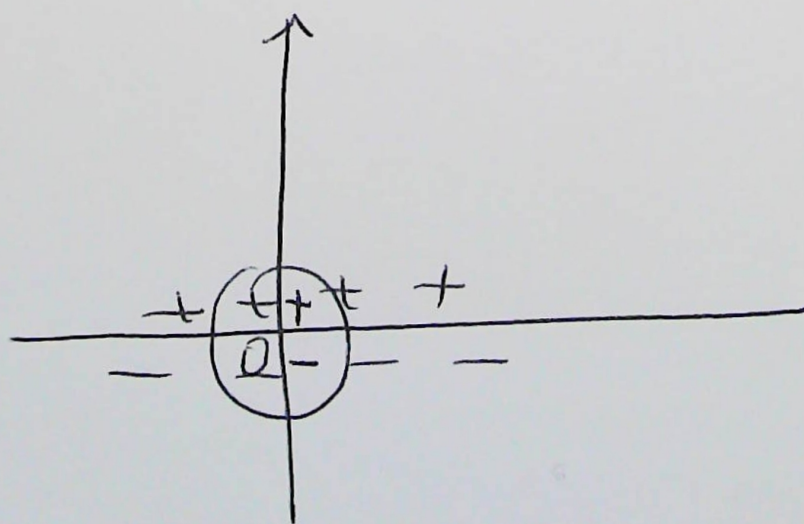
$P(-2,-1)$  MINIMO RELATIVO

$$f(x,y) - f(0,y) \geq 0 \quad x^2 y e^{x+y} - 0 > 0 \quad x^2 y e^{x+y} > 0$$

$$e^{x+y} > 0 \quad \forall (x,y)$$

$$x^2 > 0 \quad \forall x$$

$$y > 0$$



$$P(0,y)$$

$y > 0 \Rightarrow$  MINIMO REL.

$y < 0 \Rightarrow$  MAX RELAT.

$$y = 0 \Rightarrow P(0,0)$$

P.TO DI SELLA