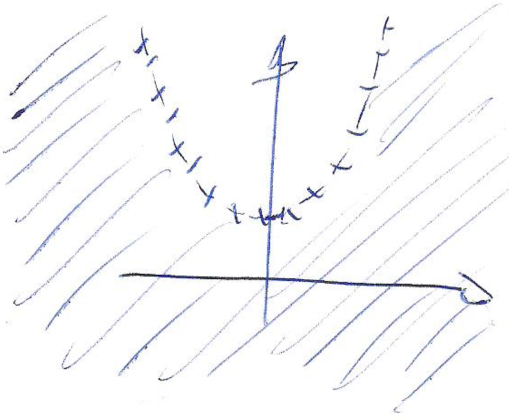
1 – $f(x,y) = \sqrt{\dfrac{e^x(2y-1)}{\ln(x^2-y+1)}}$

$$D.E. = \left\{(x,y)\in\mathbb{R}^2 : x^2-y+1>0,\ \underbrace{\frac{e^x(2y-1)}{\ln(x^2-y+1)}\geq 0}\right\}$$

$\Downarrow$



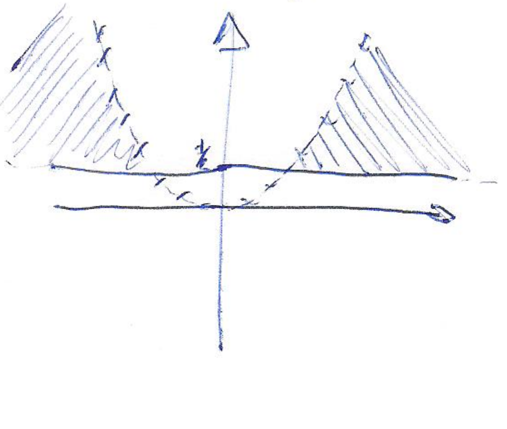
$\Updownarrow$

$$\left(\begin{cases}2y-1\geq 0\\ \ln(x^2-y+1)>0\end{cases} \vee \begin{cases}2y-1\leq 0\\ \ln(x^2-y+1)<0\end{cases}\right)$$

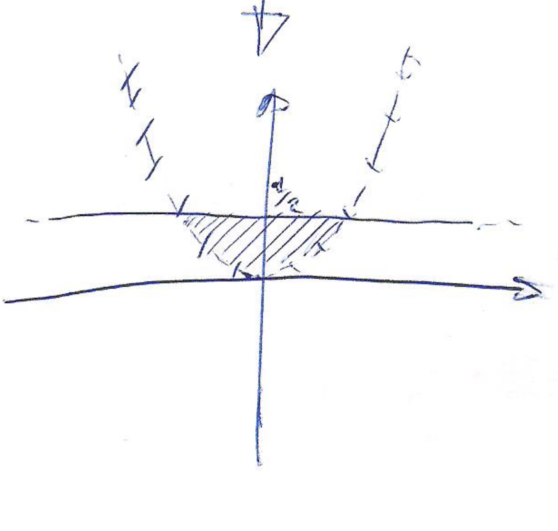
$\Updownarrow$

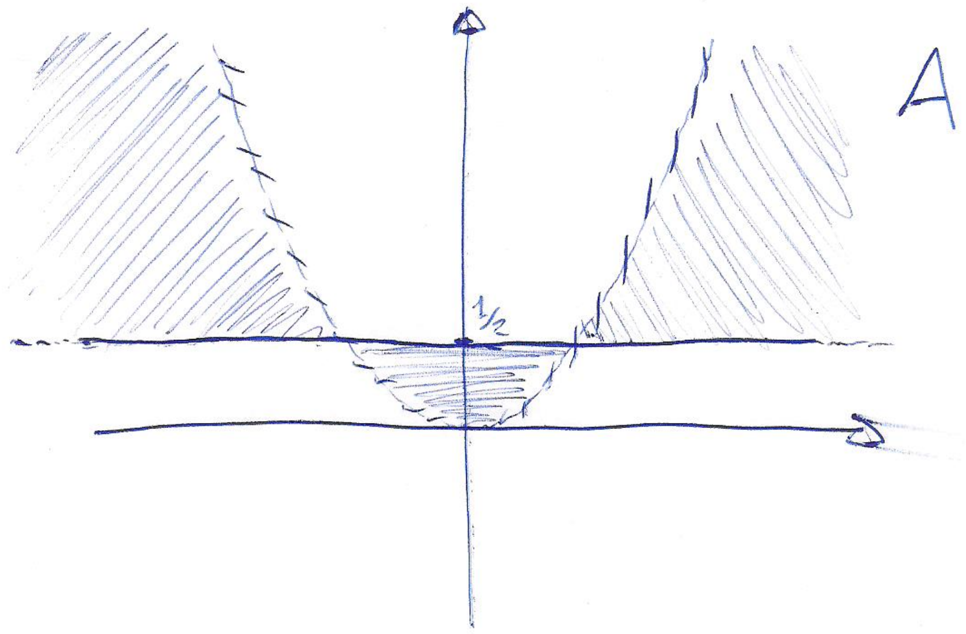
$$\begin{cases}2y-1\geq 0\\ x^2-y\cancel{+1}>\cancel{1}\end{cases} \vee \begin{cases}2y-1\leq 0\\ x^2-y\cancel{+1}<\cancel{1}\end{cases}$$

$\Downarrow$



$\Downarrow$





A è illimitato, né aperto né chiuso

- $(0, \frac{1}{2})$ e $(0,0)$ q.ti d'acc.; $(\ln 3, 0)$ no

$$\lim_{(x,y)\to(0,1/2)} f(x,y) \underset{\substack{\uparrow \\ f \text{ è continua in } (0,1/2)}}{=} f(0, 1/2) = 0$$

$$\lim_{(x,y)\to(0,0)} \sqrt{\frac{\overbrace{e^x(2y-1)}^{\to -1}}{\underbrace{\ln(x^2-y+1)}_{\to 0^-}}} = +\infty$$

- $\Gamma_f(0) = \{(x,y) \in A : f(x,y) = 0\}$

$$f(x,y) = 0 \iff e^x(2y-1) = 0 \iff \boxed{y = \frac{1}{2}}$$

$\cdot\ f(2,5-e) = e\sqrt{9-2e}$

$$\Downarrow$$

$$\Gamma_f(f(2,5-e)) = \{(x,y)\in A : \underbrace{f(x,y) = e\sqrt{9-2e}}\}$$

$$\Updownarrow$$

$$\boxed{\sqrt{\frac{e^x(2y-1)}{\ln(x^2-y+1)}} = e\sqrt{9-2e}}$$

2- $f(x,y) = (x^2+y^2)e^{-x+y^2}$, D.E. $= \mathbb{R}^2$

$$\begin{cases} \partial_x f(x,y) = -e^{-x+y^2}(-2x+x^2+y^2) = 0 \\ \partial_y f(x,y) = 2e^{-x+y^2}\,y\,(\underbrace{1+x^2+y^2}_{>0}) = 0 \end{cases}$$

$$\Updownarrow$$

$$\begin{cases} -2x+x^2+y^2=0 \\ y=0 \end{cases} \Rightarrow \begin{cases} -2x+x^2=0 \\ y=0 \end{cases}$$

$$\Updownarrow$$

$$\begin{cases} x = 0,\ 2 \\ y=0 \end{cases}$$

$\Rightarrow (0,0)$ e $(2,0)$

- $\partial_{xx} f(x,y) = e^{-x+y^2}(2-4x+x^2+y^2)$
- $\partial_{yy} f(x,y) = 2\, e^{-x+y^2}\left(1+5y^2+2y^4+x^2(1+2y^2)\right)$
- $\partial_{xy} f(x,y) = \partial_{yx} f(x,y) = -2e^{-x+y^2}y\left(1-2x+x^2+y^2\right)$

- $H_f(0,0) = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$, $\left.\begin{array}{l} |H_f(0,0)| = 4 > 0 \\ \partial_{xx} f(0,0) = 2 > 0 \end{array}\right| \Rightarrow \begin{array}{c}(0,0) \\ \text{min. rel.}\end{array}$

- $H_f(2,0) = \begin{pmatrix} -2e^{-2} & 0 \\ 0 & 10e^{-2} \end{pmatrix}$, $|H_f(2,0)| = -20e^{-4} < 0$

$\Downarrow$

né min né max

- $(0,0)$ è anche p.to di min ~~ma~~ assoluto perché $f(0,0) = 0$ e $f(x,y) \geq 0 \quad \forall (x,y) \in \mathbb{R}^2$.

---

3 _

M — M — M+N

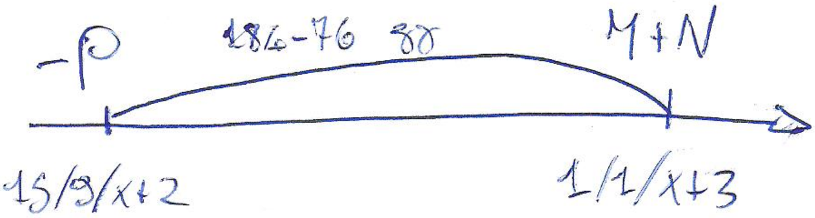
$t_5 = 1/7/X+2$ — $15/9/X+2 = t$ — $1/1/X+3$

$\tau = 184$ gg.

$M = 0{,}01 \cdot 100 = 1$

$t - t_5 = 76$ gg.

$\Rightarrow R_a = 1\,(1-0{,}2)\,\dfrac{76}{184} = \ldots$; $P = 101 + R_a$



$$0 = -P + (M+N)(1+i)^{-\frac{184-76}{184}}$$

$$\Updownarrow$$

$$\frac{P}{101} = (1+i)^{-\frac{184-76}{184}} \quad \Longleftarrow \quad \boxed{i = \left(\frac{P}{101}\right)^{-\frac{184}{184-76}} - 1}$$

4- a) Considerare $G_1 := \{(x,y) \in A : y = 1/2\}$

$G_2 := \{(x,y) \in A : y = x\}$

Si trova:

$$\lim_{x \to +\infty} f(x, 1/2) = 0$$

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

b) $f(t_1 + t_2) = f(t_1) \cdot f(t_2)$

- interessi composti: $f(t_1+t_2) = (1+i)^{t_1+t_2} = (1+i)^{t_1}(1+i)^{t_2}$

$$= f(t_1)\, f(t_2)$$

- interessi semplici anticipati:

$$f(t_1+t_2) = \frac{1}{1-d(t_1+t_2)} \neq$$

$$f(t_1)\,f(t_2) = \frac{1}{1-dt_1} \cdot \frac{1}{1-dt_2} = \frac{1}{1-d(t_1+t_2)+d^2 t_1 t_2}$$