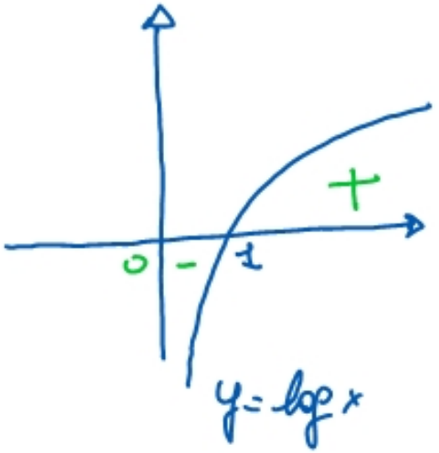
Le zone 4

- $y = \sqrt{\log(x+1)}$

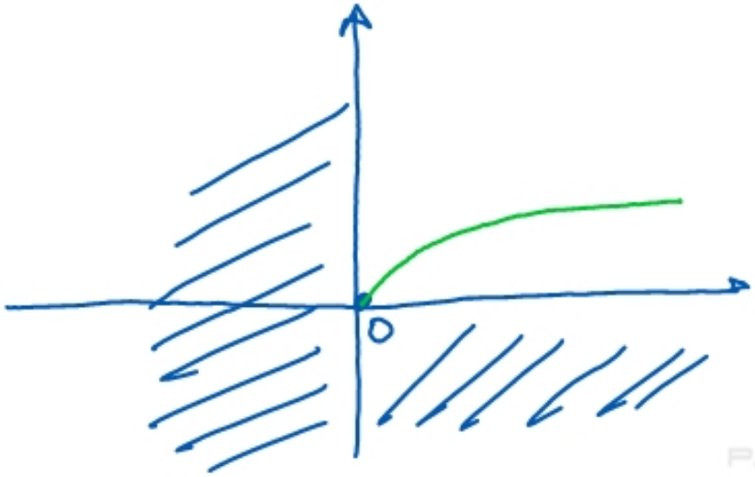
$$\begin{cases} \log(x+1) \geq 0 & \sqrt{} \\ x+1 > 0 & \log: \end{cases}$$



$$\begin{cases} x+1 \geq 1 \\ x+1 > 0 \end{cases} \qquad x \geq 0$$

$f(0) = \log 1 = 0$

$f(x) \geq 0 \quad \forall x \in \text{dom} f$



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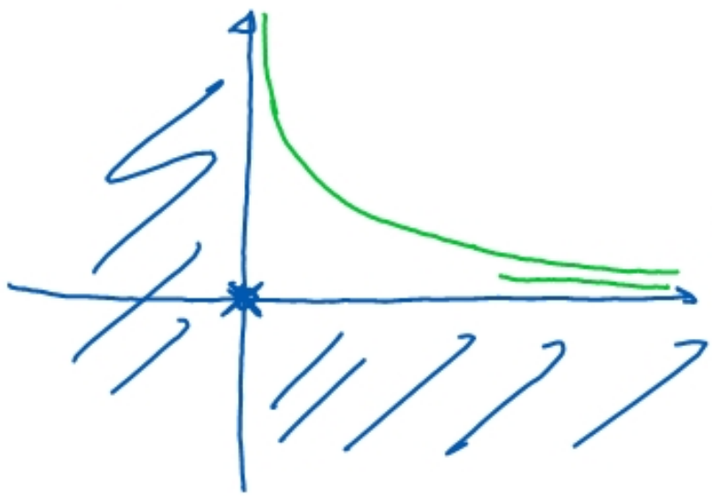
$$y = \frac{1}{\sqrt{\log(x+1)}}$$

$$\begin{cases} \sqrt{} & \log(x+1) > 0 \\ \log & x+1 > 0 \end{cases} \Rightarrow \quad x > 0$$



$x = 0$ pt. di accumulaz.

Inf. limitato

non ha min

Sup. illimitato

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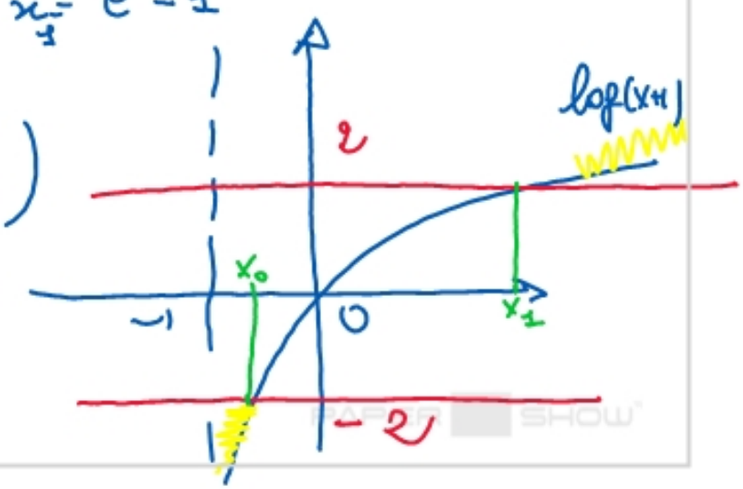
$$y = \sqrt{\log^2(x+1) - 4}$$

$$\begin{cases} x+1 > 0 \\ \log^2(x+1) - 4 \geq 0 \end{cases} \qquad \begin{cases} x > -1 \\ \log(x+1) \leq -2 \quad \cup \quad \log(x+1) \geq 2 \end{cases}$$

$\log(x+1) = -2 \quad \Rightarrow \quad x+1 = e^{-2} \qquad x_0 = e^{-2} - 1$

$\log(x+1) = 2 \quad \Rightarrow \quad x+1 = e^{2} \qquad x_1 = e^{2} - 1$

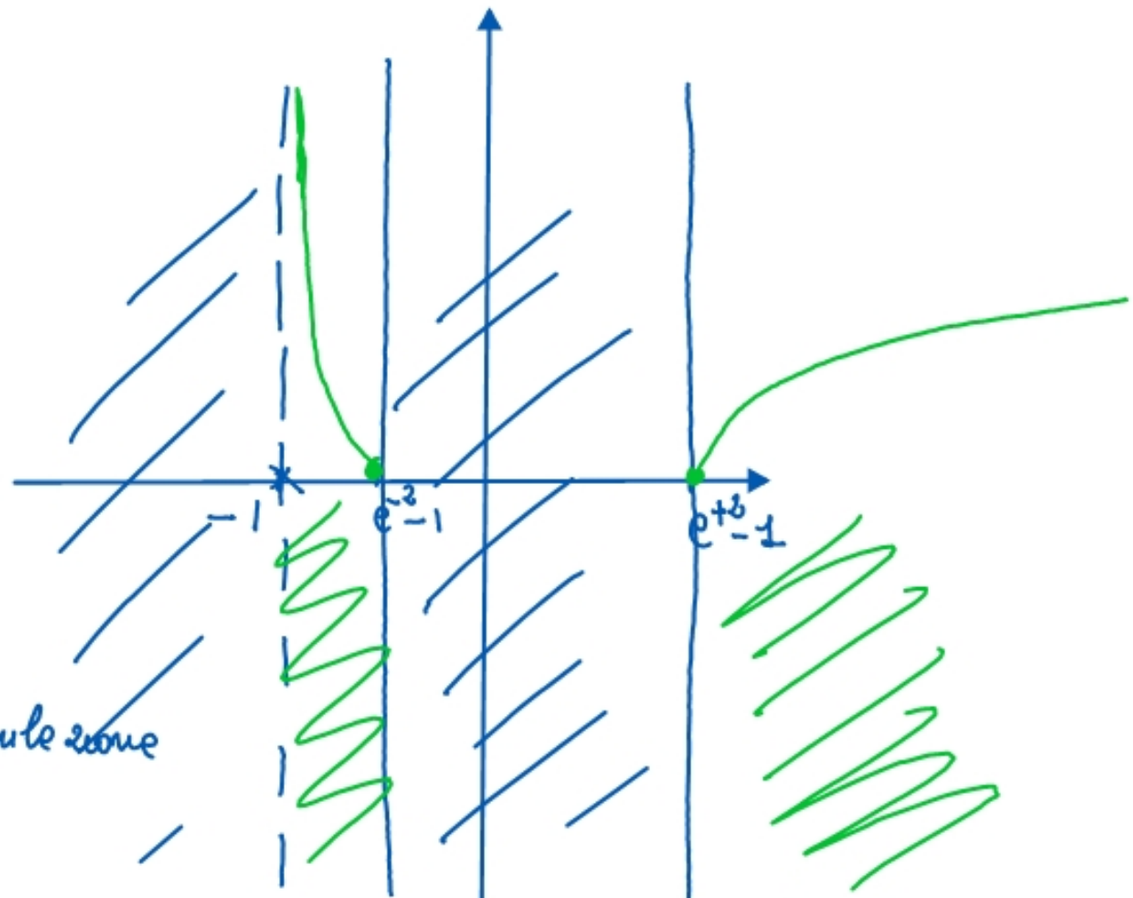
$\left(T^2 - 4 \geq 0 \qquad T \leq -2 \quad \cup \quad T \geq 2 \right)$



<u>dominio</u> : $-1 < x \leq e^{-2} - 1$

$x \geq e^{2} - 1$

$f(x) \geq 0$



$x=-1$ pt. di accumulazione

$]-1, e^{-2}-1] \cup [e^{+2}-1, +\infty[$

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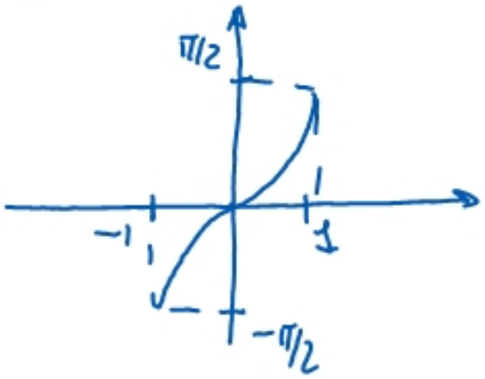
$$y = \left[\operatorname{arcsen}\sqrt{x^2-e^2}\right]^{-1} = \frac{1}{\operatorname{arcsen}\sqrt{x^2-e^2}}$$

$$\sqrt{}\quad \begin{cases} x^2-e^2 \geq 0 \\ \operatorname{arcsen}\sqrt{x^2-e^2} \neq 0 \Rightarrow \sqrt{x^2-e^2} \neq 0 \\ -1 \leq \sqrt{x^2-e^2} \leq 1 \end{cases}$$

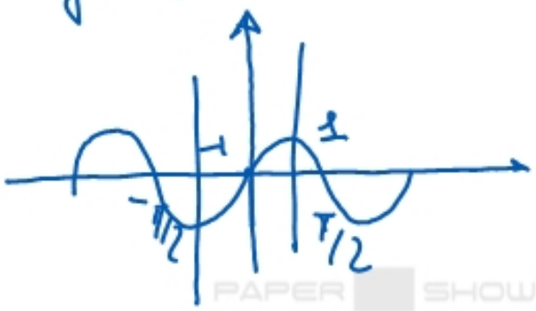
$y = \operatorname{arcsen} x$



① $x \leq -e \cup x \geq e$

② $x \neq \pm e$

$y = \operatorname{sen} x$



③ $\begin{cases} \sqrt{x^2-e^2} \geq -1 & \forall x \\ \sqrt{x^2-e^2} \leq 1 & x^2-e^2 \leq 1 \quad x^2 \leq 1+e^2 \end{cases}$

$-\sqrt{1+e^2} \leq x \leq \sqrt{1+e^2}$

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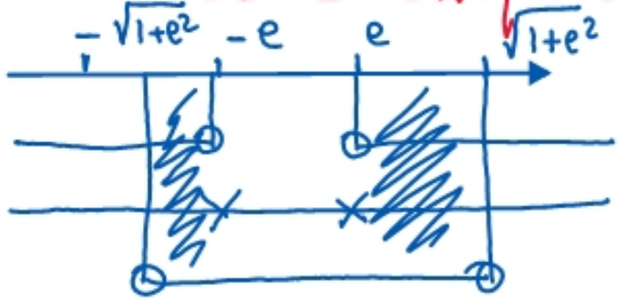
confronto

$$e \overset{?}{<} \sqrt{1+e^2} \qquad e < \sqrt{1+e^2}$$

$$e^2 < 1+e^2$$

confronto di 2 quantità purché non si effettua il cambio di verso della disequazione



unione di 2 intervalli disgiunti

f pari
$x = \pm e$ pt. di acc.

dominio $\left[-\sqrt{1+e^2}, -e\right[\cup \left]e, \sqrt{1+e^2}\right]$

$$y = \operatorname{arcsen}\left(\log\sqrt{x+1}\right)$$

- dominio
- grafico probabile dedotto da quelli elementari

$$(x+1) \longrightarrow \sqrt{x+1} \longrightarrow \log\sqrt{x+1} \Longrightarrow \operatorname{arcsen}\left(\log\sqrt{x+1}\right)$$

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COMPLESSI

notazione algebrica $\quad z = a + ib \quad (a,b) \in \mathbb{R}^2$

$z = x + iy \quad (x,y) \in \mathbb{R}^2$

$$\begin{cases} x = \rho \cos\vartheta \\ y = \rho \operatorname{sen}\vartheta \end{cases} \qquad \begin{cases} \rho = \sqrt{x^2+y^2} \quad (\geq 0) \\ \vartheta = \operatorname{arctg} \frac{y}{x} \end{cases}$$

(*) ATTENZIONE ALLA POSIZIONE NEL PIANO

$\operatorname{Tg}\vartheta = y/x$

notazione trigonometrica $\quad z = \rho(\cos\vartheta + i \operatorname{sen}\vartheta)$

notazione esponenziale $\quad z = \rho e^{i\vartheta}$

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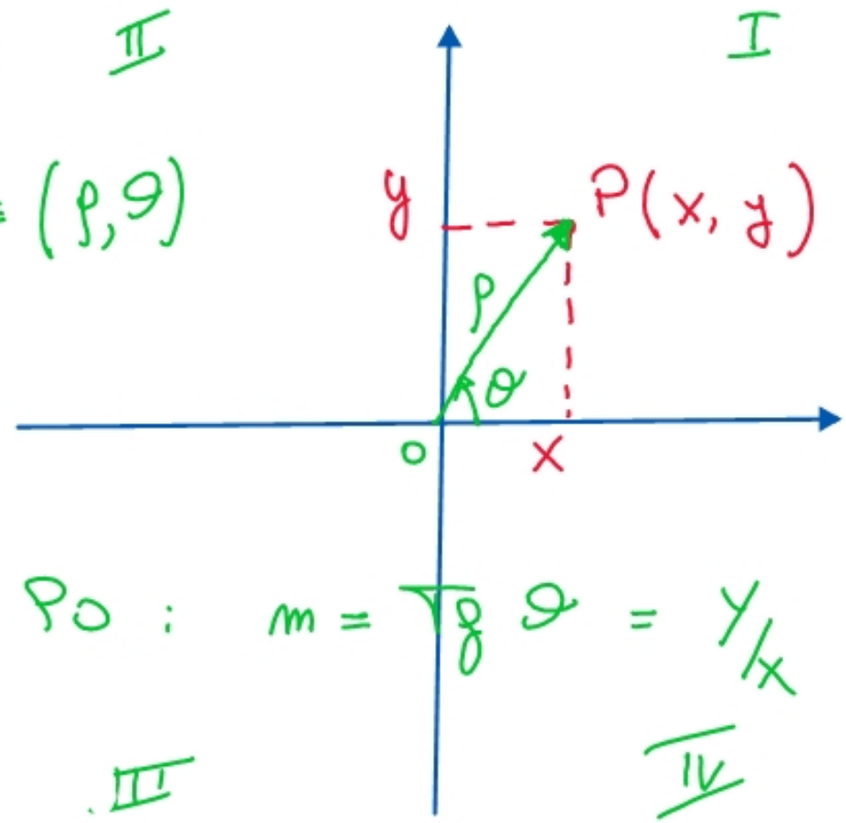
Piano di Gauss

$z = x + iy$

$\downarrow$

$P(x, y) \equiv (\rho, \vartheta)$



asse delle ascisse $\equiv \mathrm{Re}\, z$
(parte reale di z)

asse delle ordinate $\equiv \mathrm{Im}\, z$
(parte immaginaria z)

retta PO : $m = \mathrm{tg}\, \vartheta = y/x$ $\left[\dfrac{\Delta y}{\Delta x} \right]$

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es 1

$$(\sqrt{2}\, i)^2 - 4i(-5i) + 6\cancel{\sqrt{2}}\, i : (-\cancel{\sqrt{2}}\, i) =$$

$$= +2i^2 + 20i^2 - 6i^0 = \qquad i = \sqrt{-1}$$

$$= -2 - 20 - 6 = \qquad i^2 = -1$$

$$= -28 \qquad i^0 = 1$$

es 2

$$\frac{\frac{1}{2} i^{21} - \frac{1}{3} i^{41}}{\frac{3}{2} i^{31} - \frac{2}{3} i^{35}} \cdot \left(2 i^{17} + 3 i^5\right) = \frac{i^{21}\left(\frac{1}{2} - \frac{1}{3}\cancel{i^{20}}^{\,1}\right)}{i^{31}\left(\frac{3}{2} - \frac{2}{3}\cancel{i^4}_{\,1}\right)} \left(2\cancel{i^{17}}^{\,1} + 3\right) i^5 =$$

$$= i^{-5} \frac{\left(\frac{1}{2} - \frac{1}{3}\right)}{\frac{3}{2} - 2/3} 5$$

$$= -i \cdot \frac{1}{6} \cdot \frac{6}{5} \cdot 5 = -i$$

$$\begin{array}{cccc} i^0 & i^1 & i^2 & i^3 \\ \downarrow & \downarrow & \downarrow & \downarrow \\ 1 & i & -1 & -i \\ \uparrow & \uparrow & \uparrow & \uparrow \\ i^4 & i^5 & i^6 & i^7 \end{array} \quad \text{MOD } 4$$

$i^{20} = 1$

$20 : 4 = 5$
$R. = 0$

$$i^{-5} = \frac{1}{i^5} = \frac{1}{i^4} \cdot \frac{1}{i} = \frac{1}{i} \cdot \frac{1}{i} = \frac{1}{i^2} = \frac{1}{-1} = -i$$

$i^4 = 1$

1. modulo 4

2. vedo frazionare, scompongo, svolgo la divisione → togliere l'unità immaginaria al denominatore

---

$$\frac{2+3i}{5-4i} \cdot \frac{5+4i}{5+4i} = \frac{10+8i+15i+12\overset{-1}{i^2}}{25-16\overset{-1}{i^2}} = \frac{23i+10-12}{25+16} =$$

$$= \frac{-2+23i}{41} = -\frac{2}{41} + \frac{23}{41}i$$

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