④ $f_n(x) = \begin{cases} 1-e^{-nx^2}\operatorname{sen}x & x\geq 0 \\ 2-\frac{4}{\pi}\operatorname{atn}\frac{1}{e^{nx}} & x<0 \end{cases}$

fix $x=0$: $f_n(0) = 1 \longrightarrow 1$

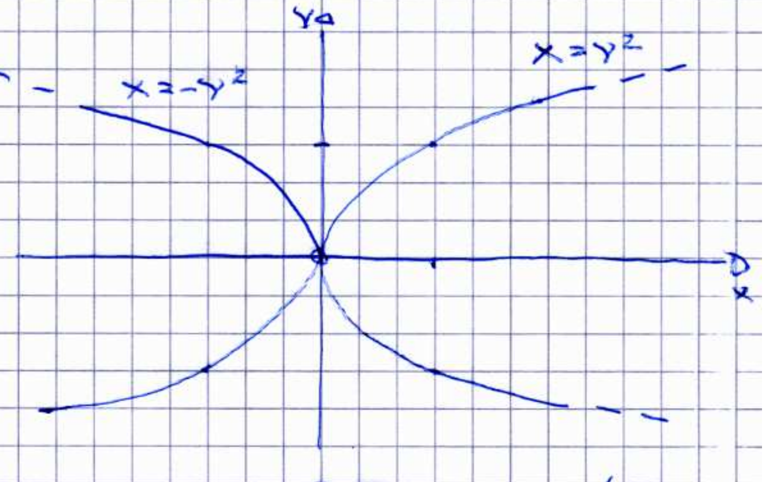
fix $x>0$: $-nx^2 \to -\infty \Rightarrow f_n(x) \longrightarrow 1$

fix $x<0$: $nx \longrightarrow -\infty \Rightarrow f_n(x) \to 2 - \frac{4}{\pi}\frac{\pi}{2} = 0$

dato che $e^{-nx} \longrightarrow 0^+$

⑤ $f(x,y) = \begin{cases} \frac{y^2}{x^2-y^4}\operatorname{sen}x & x^2-y^4 \neq 0 \\ \lambda & x^2-y^4 = 0 \end{cases}$

$x^2-y^4 = 0 \iff |x| = y^2$



$f(x,0) = \begin{cases} 0 & x\neq 0 \\ \lambda & x=0 \end{cases}$ $\quad f(0,y) = \begin{cases} 0 & y\neq 0 \\ \lambda & y=0 \end{cases}$

f parz. der.le $\Rightarrow f(x,0), f(0,y)$ $C^0 \Rightarrow \lambda = 0$

Se $\lambda = 0 \Rightarrow f$ è parz. der.le e $f_x(0,0) = f_y(0,0) = 0$.

f non è mai continua in $(0,0)$:

per rette: $y = mx$ $(m\neq 0)$

$f(x,mx) = \frac{m^2}{1-m^4x^2}\operatorname{sen}x \xrightarrow{x\to 0} 0$