RICEV. 30.11.06

Titolo nota 30/11/2006

$$\left[(n+1)!\right]^{\frac{1}{n\log n}} - (n!)^{\frac{1}{n\log n}} \longrightarrow 0$$

$(n+1)\,n!$

$$\underbrace{(n!)^{\frac{1}{n\log n}}}_{\downarrow \atop e} \left\{ (n+1)^{\frac{1}{n\log n}} - 1 \right\}$$

$$\left\{ e^{\frac{1}{n\log n}\cdot \log(n+1)} - 1 \right\}$$

$$\downarrow$$

$$e^{0} - 1 = 0$$

$$\left(\sqrt[n]{n!}\right)^{\frac{1}{\log n}} =$$

$$\left(\frac{\sqrt[n]{n!}}{n}\right)^{\frac{1}{\log n}} \cdot \underbrace{n^{\frac{1}{\log n}}}_{e^{\frac{1}{\log n}\cdot\log n}}$$

$$\downarrow$$

$$\left(\frac{1}{e}\right)^{0} \qquad e$$

$$\sqrt[4]{\frac{2n^2+3}{n^2+1}} = \sqrt[4]{\frac{2\cancel{n^2}\left(1+\frac{3}{2n^2}\right)}{\cancel{n^2}\left(1+\frac{1}{n^2}\right)}} = \sqrt[4]{2}\left(1+\frac{3}{2n^2}\right)^{\frac{1}{4}}\left(1+\frac{1}{n^2}\right)^{-\frac{1}{4}}$$

Del tipo $(1+t)^\alpha$
si sviluppano con
Taylor

$$\sum \frac{\alpha^n}{n \log^2 n} \qquad \boxed{\alpha > 0} \qquad \sum \underbrace{\frac{1}{n\log^2 n}}_{c_n} x^n$$

$\sqrt[n]{|c_n|} \to 1$ $\qquad R = 1$

$x \in (-1,1)$ Ok
$x > 1$ opp. $x < -1$ NO
$x = \pm 1$ si prova

$\sum \alpha^n \log(1+|\alpha|^n)$ $\qquad \alpha > 0$

Radice $\qquad \alpha \sqrt[n]{\log(\ )}$ $\rightsquigarrow$ BOH

$\alpha > 1 \qquad \alpha^n \log(1+|\alpha|^n) \geq \log 2 \to$ NO COND. NEC.

$\alpha = 1 \qquad$ quasi stessa cosa

$0 < \alpha < 1 \qquad \alpha^n \log(1+|\alpha|^n) \sim \alpha^{2n}$

$\log(1+t) \sim t$

$$\sqrt[n]{\log(1+\alpha^n)} \begin{cases} \alpha < 1 & \sim \sqrt[n]{\alpha^n} \longrightarrow \alpha \\ \alpha > 1 & \sim \sqrt[n]{\log \alpha^n} = \sqrt[n]{n \log \alpha} \to 1 \end{cases}$$

$$\sum n^{\alpha}\left(1-\cos\frac{1}{n}\right) \qquad n^{\alpha}\left(1-\cos\frac{1}{n}\right) \sim n^{\alpha}\frac{1}{2n^2}$$

C.A. con $b_n = \dfrac{1}{n^{2-\alpha}}$ $\qquad = \dfrac{1}{2n^{2-\alpha}}$

$2-\alpha > 1$

$\alpha < 1$

$$\lim_{n\to+\infty} \frac{n^{\alpha}\left(1-\cos\frac{1}{n}\right)}{\frac{1}{n^{2-\alpha}}} =$$

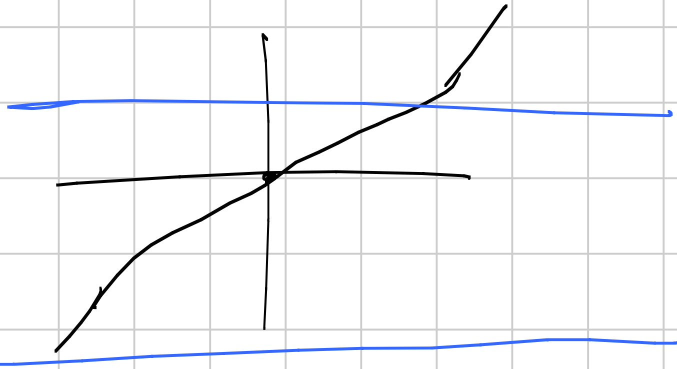
$x = \frac{1}{n}$

$$= \lim_{n\to+\infty} \frac{1-\cos\frac{1}{n}}{\frac{1}{n^2}} = \lim_{x\to 0} \frac{1-\cos x}{x^2} = \frac{1}{2} \begin{matrix}\neq 0 \\ \neq +\infty\end{matrix}$$

$$f(x) = x - (\sin\lambda)\arctan x$$

$$f'(x) = 1 - (\sin\lambda)\frac{1}{1+x^2} > 0$$

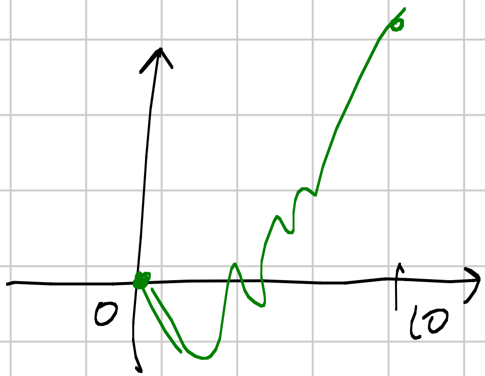
$$\frac{1+x^2-\sin\lambda}{1+x^2} > 0$$ $e \Rightarrow$ al + per $x \Rightarrow$



$$\{x \in [0,10] : \underbrace{x^3 - 17\sin x}_{f(x)} \geq 0\}$$

$x=0$ verifica ? SI $\Rightarrow$ MIN $=0$

$x=10$ " ? SI $\Rightarrow$ MAX $=10$



$f(x) = x^3 - 17 \sin x$ ← lo sviluppo di questa contiene solo potenze DISPARI

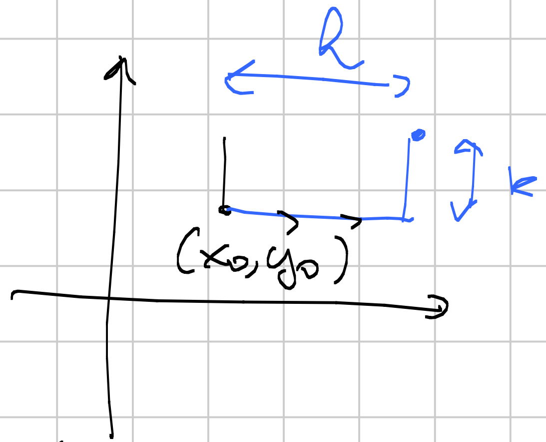
$f^{(500)}(0) = 0$

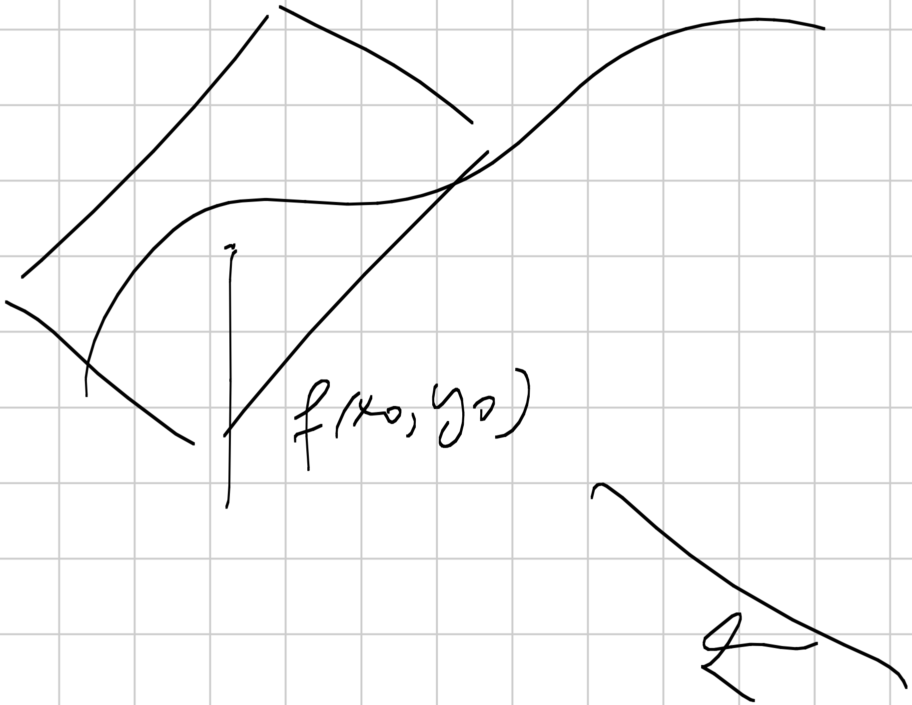
$$\dots + \frac{f^{(500)}(0)}{500!} x^{500} + \dots = P_{1000}(x)$$

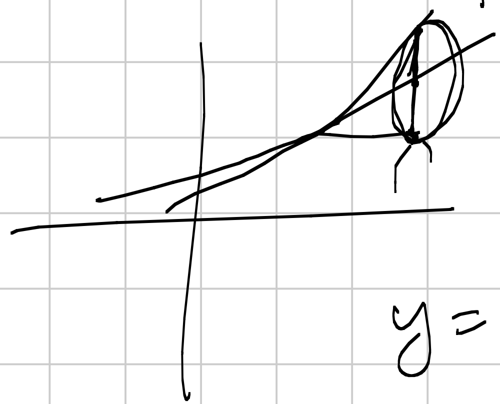
$$x^3 - 17 \sin x = -17 \frac{x^{501}}{501!}$$ ← termine di grado 501

$$\frac{f^{(501)}(0)}{501!} x^{501} \Rightarrow f^{(501)}(0) = -17$$

$$f(x_0+h,\, y_0+k) = f(x_0,y_0) + h f_x(x_0,y_0) + k f_y(x_0,y_0)$$

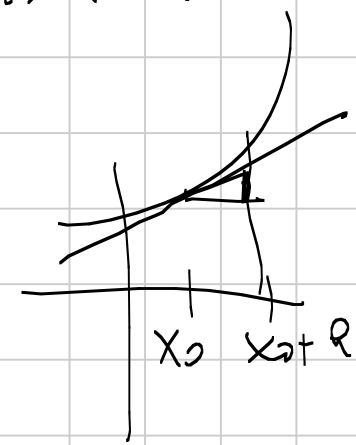






$$y = mx + n$$

$$z = ax + by + c$$



$$\sum \frac{2+\cos n}{n} \qquad \frac{2+\cos n}{n} \geq \frac{1}{n}$$

$$\sum \frac{(-1)^n}{\sqrt{n}+\sqrt[3]{n}}$$ Leibnitz $\Rightarrow$ conv

$$\sum \frac{1}{\sqrt{n}+\sqrt[3]{n}}$$ Div. per C.A. con $\frac{1}{\sqrt{n}}$

$\sum (-1)^n \frac{1}{n}$ conv. $\qquad \sum \frac{1}{n}$ div.