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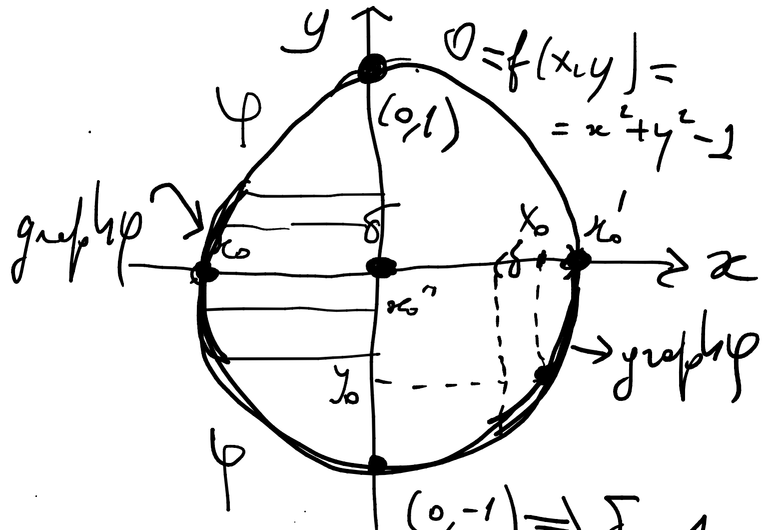
$\mathbb{R}^2$

$$f(x,y)=0$$

$$f(x_0,y_0)=0 \qquad x_0,\ y_0 \in \mathbb{R}$$



$$0 = f(x,y) = x^2+y^2-1$$

$(0,-1) \Rightarrow \delta = 1$

$$\boxed{\varphi(x) = -\sqrt{1-x^2}}$$

$$\varphi : \ \to \mathbb{R}$$

$$f(x,\varphi(x)) \equiv 0$$

CASO VETTORIALE

$$\begin{cases} f_1(x_1,\dots x_n, y_1,\dots y_m)=0 \\ \vdots \\ f_m(x_1,\dots,x_n,y_1,\dots y_m)=0 \end{cases}$$

$$\exists B(x_0,\delta) \quad \varphi : B(x_0,\delta) \to \mathbb{R}^m :$$

$$f(x,\varphi(x)) \equiv 0 \ (\text{in } \mathbb{R}^m)$$

$$\begin{cases} y_1 = \varphi_1(x_1 \dots x_n) \\ \vdots \\ y_m = \varphi_m(x_1,\dots,x_n) \end{cases}$$

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$$\lim_{x \to x_0} \gamma(x) = \infty \qquad \gamma : \mathbb{R} \to \mathbb{R}^n$$

$$\forall \varepsilon > 0 \ \exists \delta > 0 : \forall x \in \operatorname{dom} \gamma \ \underbrace{x_0 - \delta < x < x_0}_{\text{dom}} \Rightarrow \underbrace{|\gamma(x)| > \varepsilon}_{\text{codom}}$$

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

$$\forall \varepsilon > 0 \ \exists \delta > 0 : \forall x \in \operatorname{dom} f \ |x| > \delta \qquad f(x) > \varepsilon$$

$$\lim_{0} \frac{1}{x} = \infty$$

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$$\lim_{x \to \pm\infty} \equiv \lim_{\infty}$$

$$x \to \infty \iff |x| \to +\infty$$

$f(x) = x \quad f: \mathbb{R} \to \mathbb{R}$

$$\lim_{\infty} x = \infty$$

$$\forall \varepsilon > 0 \ \exists \delta > 0 : \ \underline{|x| > \delta} \Rightarrow \underline{|x| > \varepsilon}$$

δ : $\underline{\underline{\delta = \varepsilon}}$

$$\lim_{x \to +\infty} f(x) = +\infty \qquad x > \delta \Rightarrow f(x) = x > \varepsilon$$

$$\lim_{x \to -\infty} f(x) = -\infty \qquad x < -\delta \Rightarrow f(x) = x < -\varepsilon$$