Taylor

f derivabile in $x_0 \in (a,b)$

$$f(x) = f(x_0) + f'(x_0)(x - x_0) + o(x - x_0) \quad \text{per } x \to x_0$$

$$\lim_{x \to x_0} \frac{o(x - x_0)}{x - x_0} = 0$$

Taylor con resto di Peano

$$f(x) = P_n(x) + R_n(x)$$

$$R_n(x) = o((x - x_0)^n)$$
per $x \to x_0$

$$P_n(x) = \sum_{j=0}^{n} \frac{f^{j}(x_0)}{j!} \cdot (x - x_0)^j$$

Taylor con resto di Lagrange

$$f(x) = P_n(x) + R_n(x) \qquad R_n(x) = \frac{f^{n+1}(z)\,(x - x_0)^{n+1}}{(n+1)!}$$

per $x \to x_0$

Autovalori

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix} \Rightarrow \det \begin{pmatrix} a-\lambda & b \\ c & d-\lambda \end{pmatrix} = (a-\lambda)(d-\lambda) - bc$$

$$= ad - a\lambda - d\lambda + \lambda^2 - bc$$

Faccio il Δ e ho 2 soluzioni $\Rightarrow$

$(+,+)$ min
$(-,-)$ max
$(\pm,\mp)$ sella
$(0,\pm)$ degenere

Max e Min (Hf)

$\det(Hf(x_0,y_0)) > 0$ → $f_{xx}(x_0,y_0) > 0$ min locale

$\det(Hf(x_0,y_0)) > 0$ → $f_{xx}(x_0,y_0) < 0$ max locale

$\det(Hf(x_0,y_0)) = 0$ indeterminato

$\det(Hf(x_0,y_0)) < 0$ (x_0,y_0) é pt. di sella

Coordinate polari

$$\begin{cases} x = \rho\cos\theta \\ y = \rho\sin\theta \end{cases} \qquad \rho > 0 \qquad \rho = \sqrt{x^2+y^2}$$

$$0 \leq \theta < 2\pi$$

Se $\lim\limits_{(x,y)\to(0,0)} f(x,y) \Rightarrow \lim\limits_{\rho\to 0^+} f(\rho,\theta)$

Se $\lim\limits_{(x,y)\to+\infty} f(x,y) \Rightarrow \lim\limits_{\rho\to+\infty} f(\rho,\theta)$