

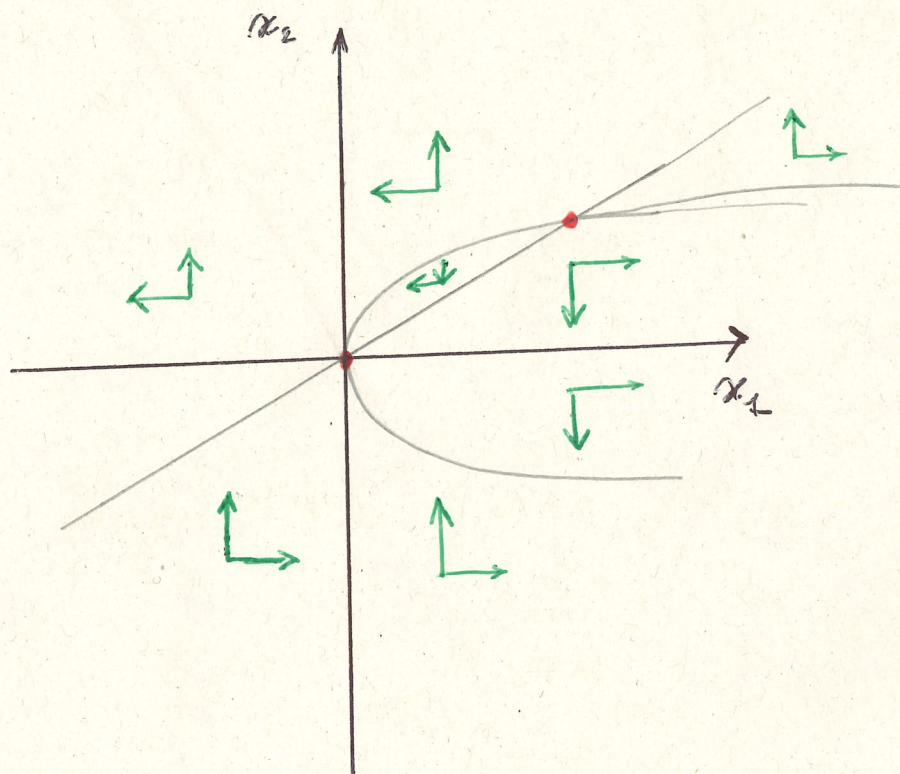
Vector field and nullclines

$$\begin{cases} \frac{dx_1}{dt} = f_1(x_1, x_2) = x_1 - x_2 \\ \frac{dx_2}{dt} = f_2(x_1, x_2) = x_2^2 - x_1 \end{cases}$$

Steady states

$$x_{ss1} = (0, 0)$$

$$x_{ss2} = (1, 1)$$



Nullclines

⇒ they intersect in the steady states

$$f_1 = 0$$



$$f_1 \Rightarrow x_1 = x_2$$

$$f_2 = 0$$



$$x_2^2 > x_1$$

$$\begin{cases} f_1 > 0 \\ x_1 > x_2 \end{cases}$$

$$\begin{cases} f_2 > 0 \\ x_2 > \sqrt{x_1} \end{cases}$$

⇒ One steady state is an unstable focus node and one a saddle.