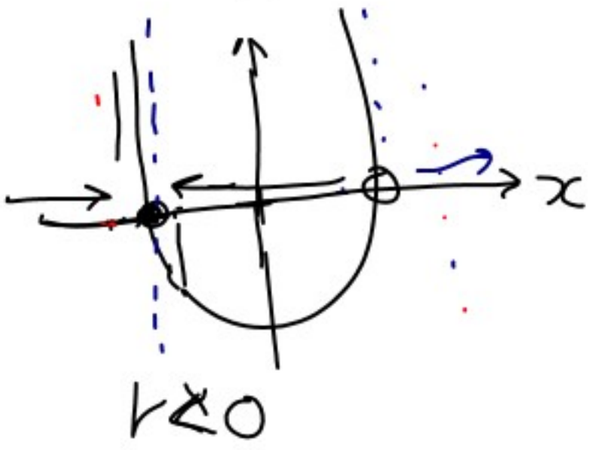
$\dot{x} = r + x^2$

$0 = r + x^2$

$\pm\sqrt{-r} = x$

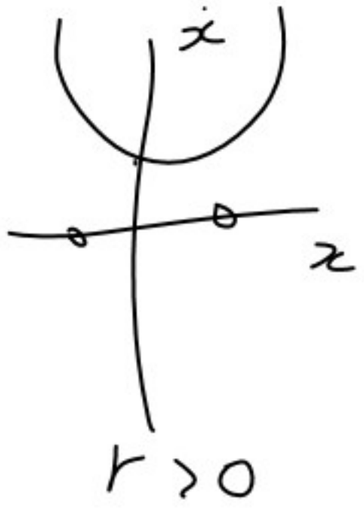
$r < 0$



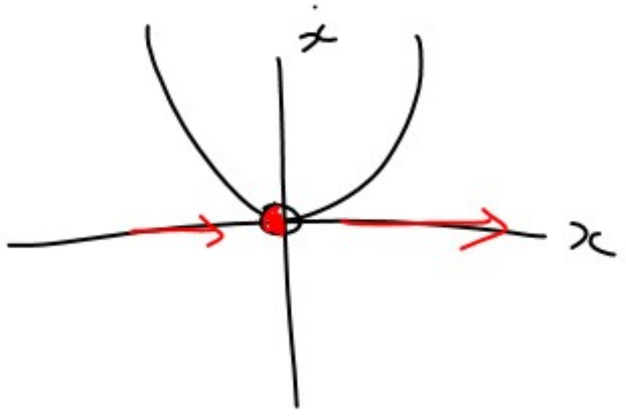
$r = 0$

$r > 0$

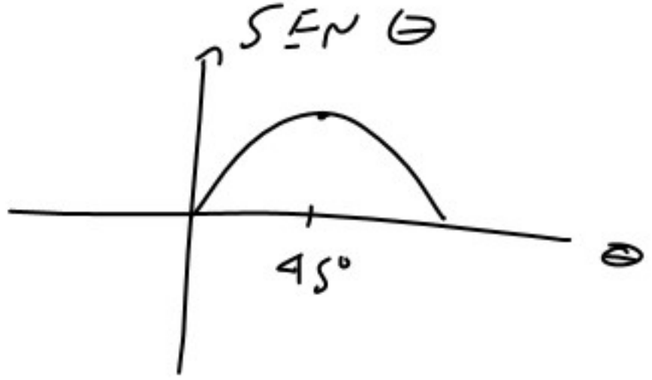
$r < 0$

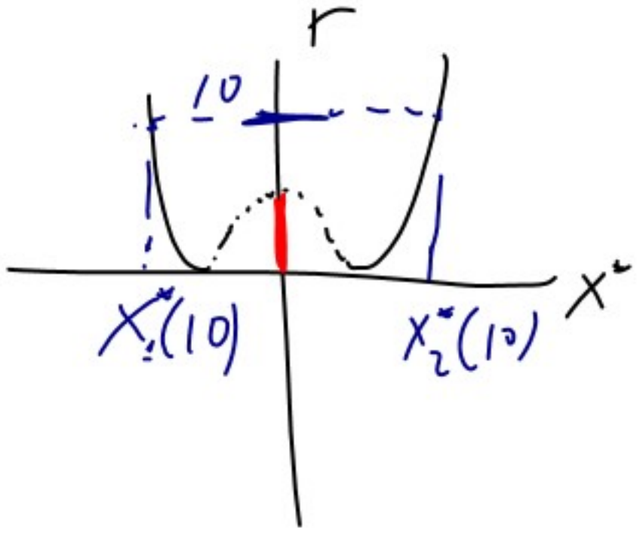


$r > 0$



$r = 0$

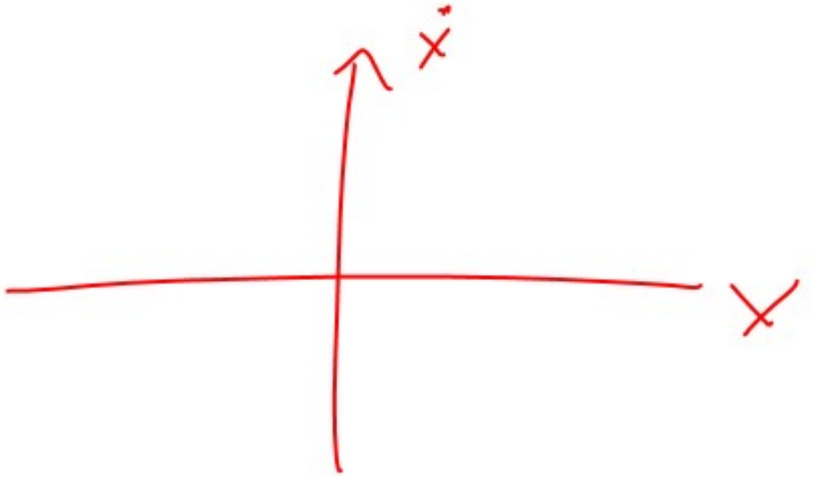


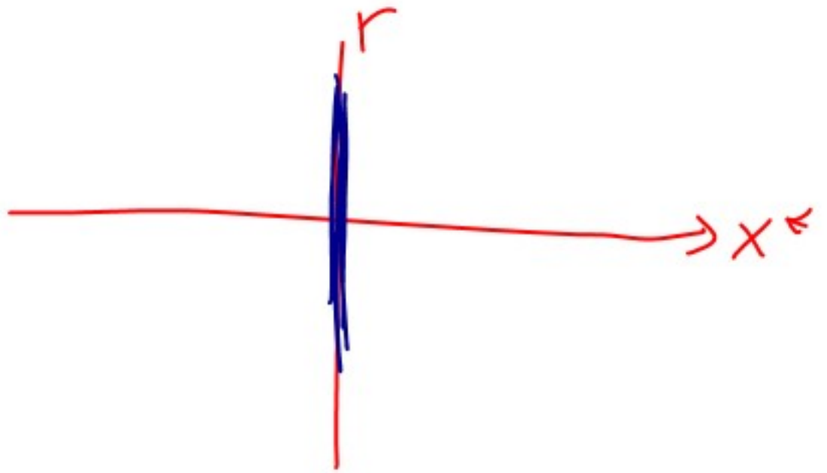


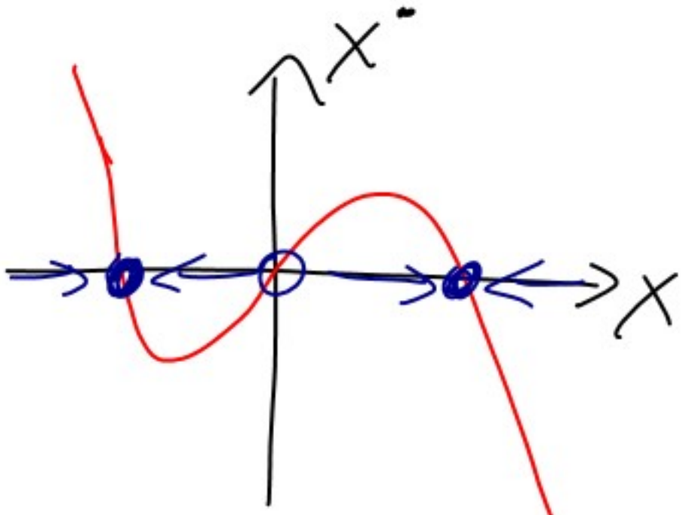
$$\dot{x} = rx + x^3 - x^5$$

$$0 = rx + x^3 - x^5$$

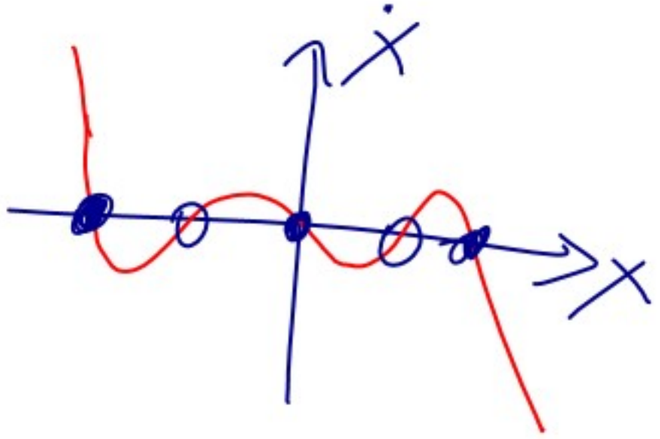
$$r = x^4 - x^2 \qquad x \neq 0$$



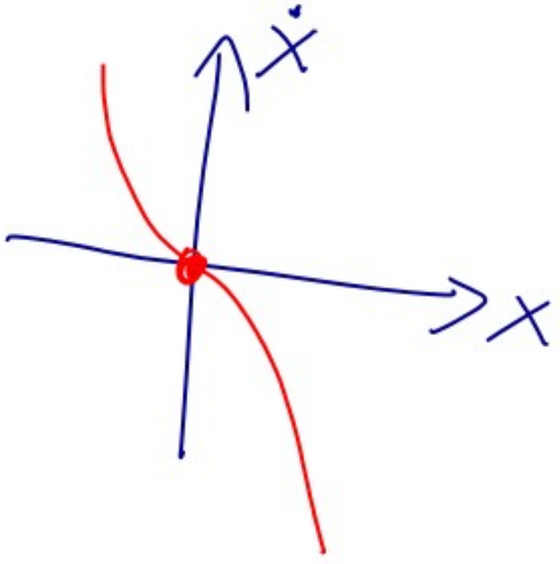




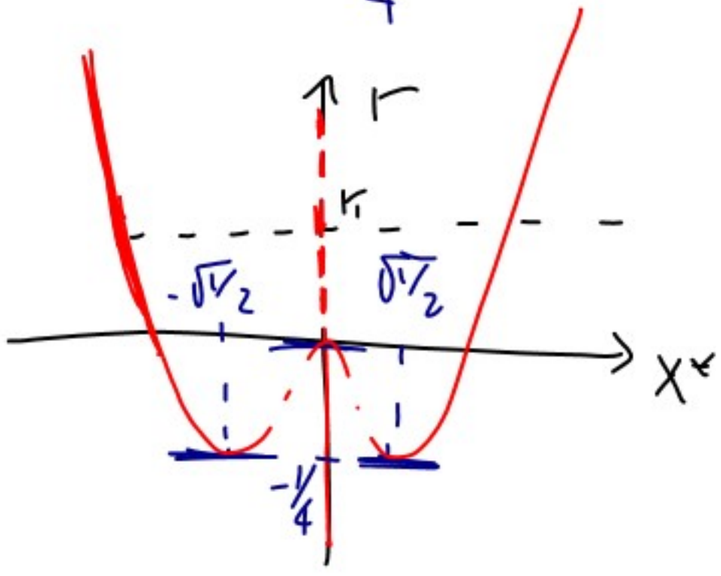
$r_1 > 0$



$-\frac{1}{4} \le r_2 \le 0$



$r < -1/4$



$$\dot{x} = \lambda x$$

$$\frac{dx}{dt} = \lambda x$$

$$\int \frac{dx}{x} = \int \lambda dt$$

$$\ln x = \lambda t + c$$

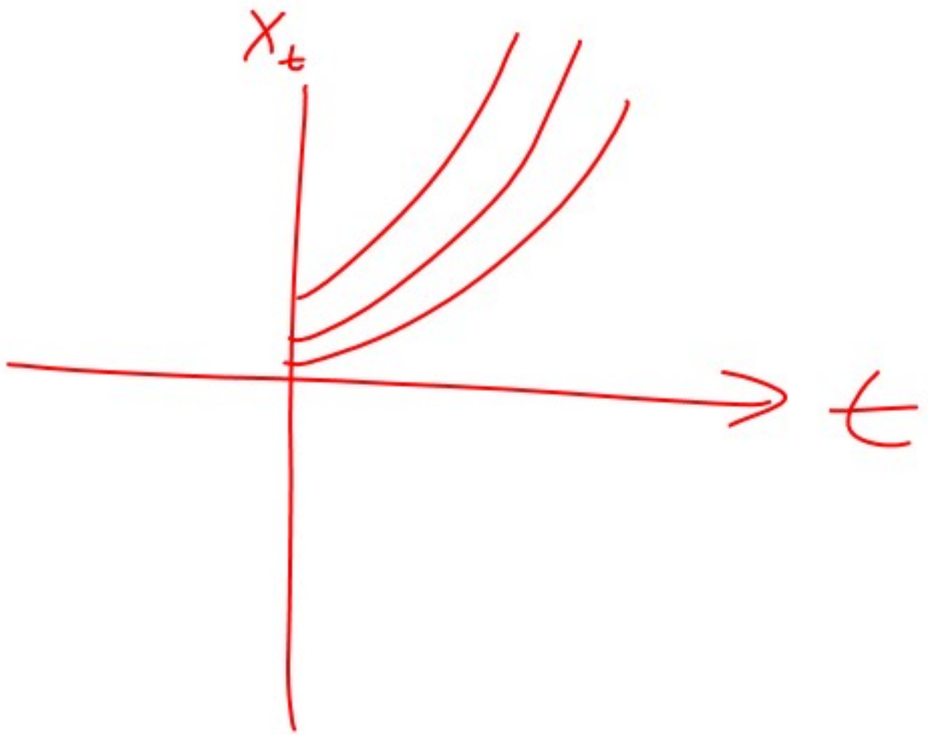
$$x_{t+1} = x_t + \lambda \Delta t$$

USD USD $\frac{USD}{DIA}$ DIAS

$$e^{\ln x} = e^{\lambda t + c}$$

$$x_t = \mathbb{Z} e^{\lambda t} = x_0 e^{\lambda t}$$

$$x(t=0) = x_0 \} \Rightarrow x_0 = \mathbb{Z} e^{\lambda 0}$$


X_t
t

$$\dot{X} = \lambda_x X \longrightarrow X_t = X_0 e^{\lambda_x t}$$

$$\dot{Y} = \lambda_y Y \longrightarrow Y_t = Y_0 e^{\lambda_y t}$$

$$\begin{pmatrix} \dot{X} \\ \dot{Y} \end{pmatrix} = \begin{pmatrix} \lambda_x & 0 \\ 0 & \lambda_y \end{pmatrix} \begin{pmatrix} X \\ Y \end{pmatrix} \qquad \begin{pmatrix} X_t \\ Y_t \end{pmatrix} = \begin{pmatrix} X_0 e^{\lambda_x t} \\ Y_0 e^{\lambda_y t} \end{pmatrix}$$

$$\begin{pmatrix} \dot{x} \\ \dot{y} \end{pmatrix} = \begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix}$$

$$A = P \begin{pmatrix} \rho_1 & 0 \\ 0 & \rho_2 \end{pmatrix} P^{-1}$$

$$\begin{pmatrix} \dot{y}_1 \\ \dot{y}_2 \end{pmatrix} = \begin{pmatrix} \rho_1 & 0 \\ 0 & \rho_2 \end{pmatrix} \begin{pmatrix} y_1 \\ y_2 \end{pmatrix}$$

$$\begin{pmatrix} \dot{x}_1 \\ \dot{x}_2 \end{pmatrix} = A \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$$

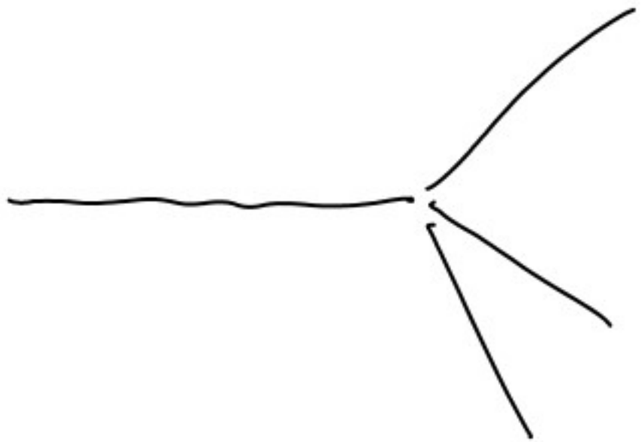
↳ $\begin{pmatrix} v_1 & v_2 \end{pmatrix}$

$$P^{-1} \begin{pmatrix} \dot{x}_1 \\ \dot{x}_2 \end{pmatrix} = P^{-1} P \begin{pmatrix} \rho_1 & 0 \\ 0 & \rho_2 \end{pmatrix} P^{-1} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$$

$$P^{-1} \begin{pmatrix} \dot{x}_1 \\ \dot{x}_2 \end{pmatrix} = \begin{pmatrix} \rho_1 & 0 \\ 0 & \rho_2 \end{pmatrix} P^{-1} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$$

$$\begin{pmatrix} y_1 \\ y_2 \end{pmatrix} = P^{-1} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$$

$$\begin{pmatrix} \dot{y}_1 \\ \dot{y}_2 \end{pmatrix} = P^{-1} \begin{pmatrix} \dot{x}_1 \\ \dot{x}_2 \end{pmatrix}$$



$$\dot{x} = f(x)$$