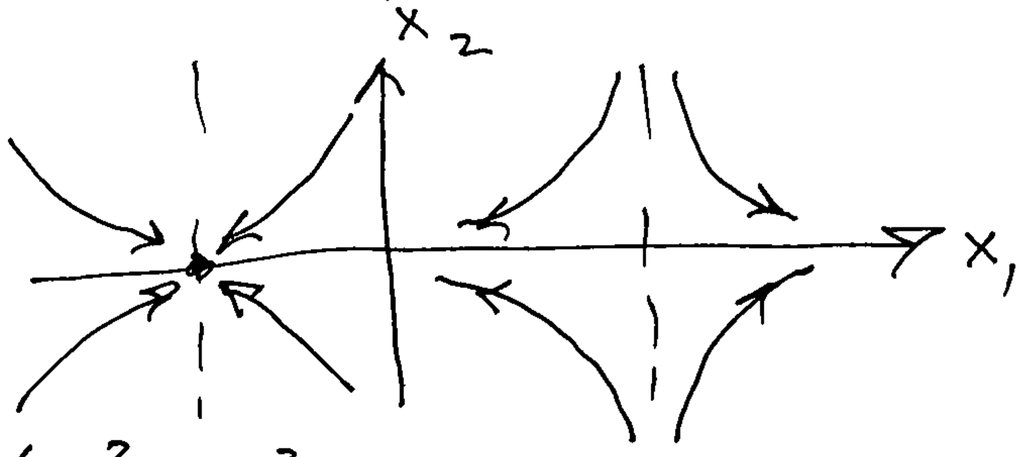
4) $\begin{cases} \dot{x}_1 = x_1^2 + a \\ \dot{x}_2 = -x_2 \end{cases}$ $\qquad x_{1*} = \pm\sqrt{-a}\,, \quad x_{2*} = 0$

$a < 0$ $\qquad \frac{1}{2\sqrt{-a}} \ln \left| \frac{x_1 - \sqrt{-a}}{x_1 + \sqrt{-a}} \right| = t + c_1,$

$a > 0$ $\qquad \frac{1}{\sqrt{a}} \operatorname{arctg} \frac{x_1}{\sqrt{a}} = t + c_1$

$x_2 = c_2 e^{-t}$



5) $\begin{cases} \dot{x}_1 = a x_1 - x_2 - x_1 (x_1^2 + x_2^2) \\ \dot{x}_2 = x_1 + a x_2 - x_2 (x_1^2 + x_2^2) \end{cases}$

$\begin{cases} x_1 = r\cos\varphi \\ x_2 = r\sin\varphi \end{cases}$

$\begin{cases} \dot{r}\cos\varphi - r\sin\varphi \cdot \dot{\varphi} = a r\cos\varphi - r\sin\varphi - r^3\cos\varphi \\ \dot{r}\sin\varphi + r\cos\varphi \cdot \dot{\varphi} = r\cos\varphi + a r\sin\varphi - r^3\sin\varphi \end{cases}$

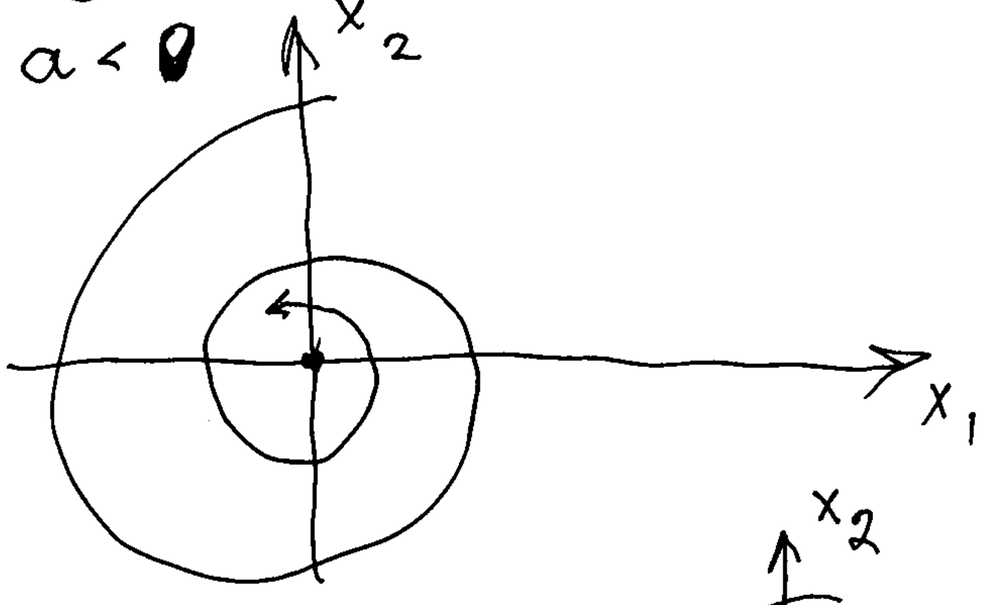
$\Delta = r, \quad \Delta_r = r^2(a - r^2), \quad \Delta_\varphi = r$

$\begin{cases} \dot{r} = r(a - r^2) \\ \dot{\varphi} = 1 \end{cases}$

$r_0 = 0, \quad r_* = \sqrt{a}$

$\left(r(a - r^2)\right)'_r = a - 3r^2$

$a < 0$



$a > 0$