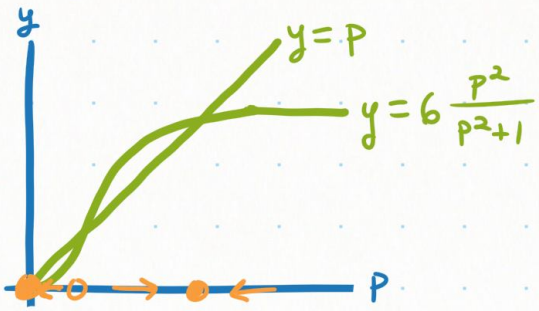
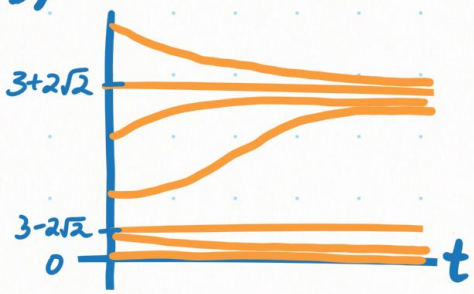
1 $\dot{p} = -p + A\frac{p^2}{p^2+1}$, $p(t) \geq 0$, $A > 0$

a) $A = 6$

$p^* = 0, 3 \pm 2\sqrt{2}$

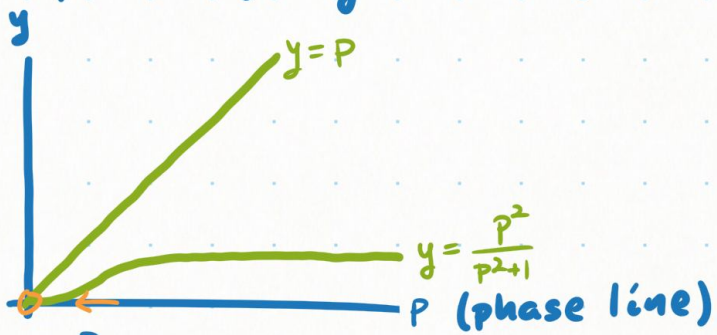


b) p

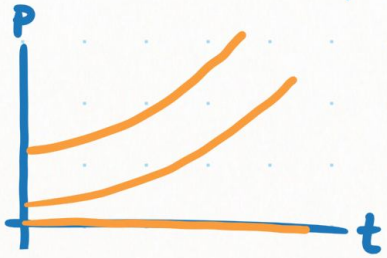


c) $A = 1$

$p^* = 0$ (only 1 real fixed point)



d)



e) Choose $A = 6$ since the system has nonzero steady states for $A = 6$ but not $A = 1$. You must also start with $p(0) \geq 3 - 2\sqrt{2}$.

2 In order to exhibit the behavior seen in the video, there must be 3 real p^*.

$$0 = -p + A\frac{p^2}{p^2+1}$$

$$0 = p(p^2 - Ap + 1)$$

$$p^* = 0, \quad \frac{A \pm \sqrt{A^2-4}}{2}$$

There are 3 real p^* if $A^2 > 4 \rightarrow A > 2$.