5.3.4 Analyze $\dot{x} = ay$ $\dot{y} = bx$.

$$\dot{x} = ay$$

$$\dot{y} = bx.$$

$$A = \begin{pmatrix} 0 & a \\ b & 0 \end{pmatrix}$$

$\tau = 0$
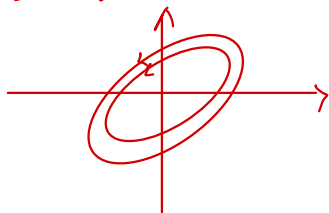
$\Delta = -ab.$

$\tau^2 - 4\Delta = -4ab$

$$\lambda_{1,2} = \frac{0 \pm \sqrt{[0]^2 - 4ab}}{2} = \pm\sqrt{ab}.$$

Case 1
when $ab > 0$,

$\Delta < 0.$

Case 2 $ab < 0$,

$\Delta > 0.$

$$\begin{pmatrix} \sqrt{ab} & a \\ b & \sqrt{ab} \end{pmatrix} \begin{pmatrix} V_1 \\ V_2 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

$$V_1 = \begin{pmatrix} -\frac{\sqrt{a}}{\sqrt{b}} \\ 1 \end{pmatrix} \qquad V_2 = \begin{pmatrix} \frac{\sqrt{a}}{\sqrt{b}} \\ 1 \end{pmatrix}$$