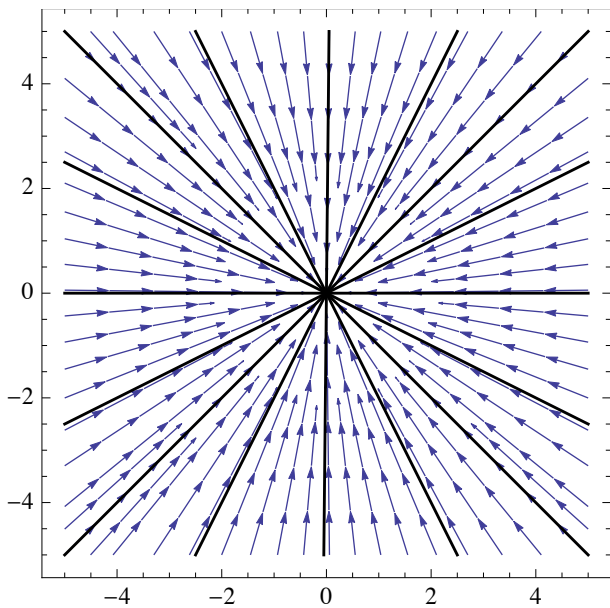


Lecture Handout, Apr 29: Phase Portraits

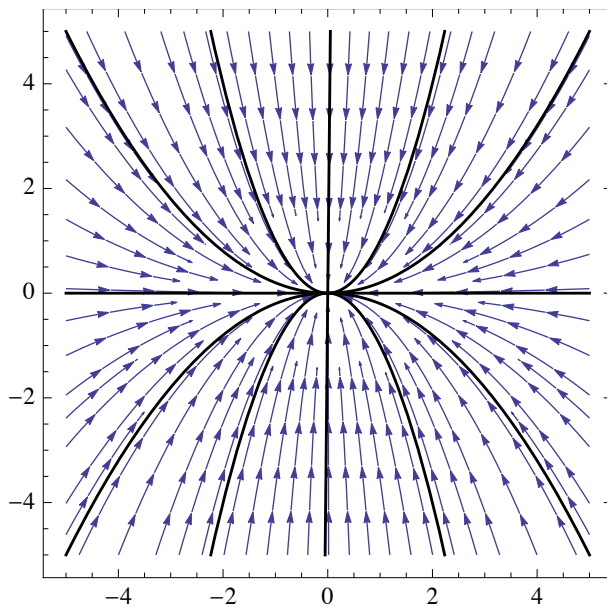
$$x' = -x, y' = -y$$



CP: _____

Stability: _____

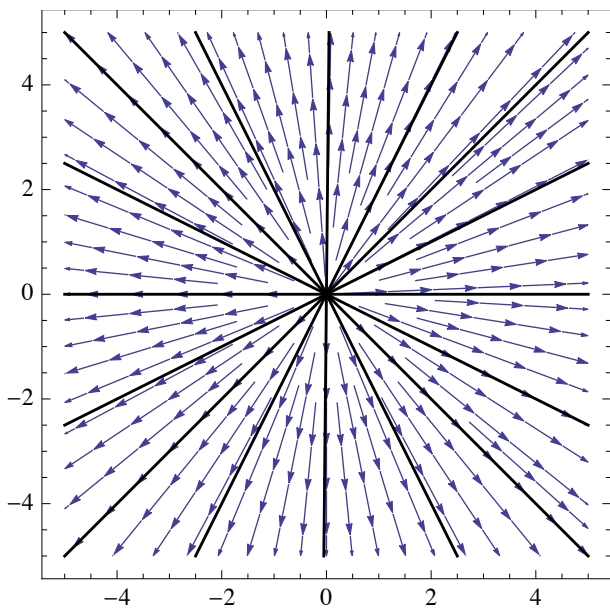
$$x' = -x, y' = -2y$$



CP: _____

Stability: _____

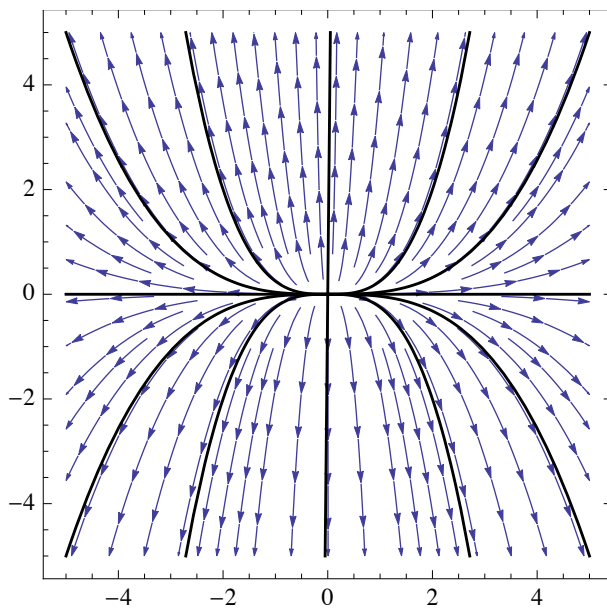
$$x' = x, y' = y$$



CP: _____

Stability: _____

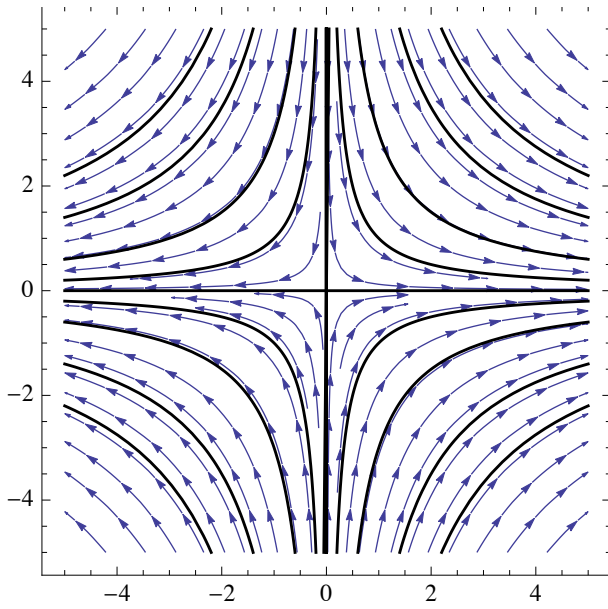
$$x' = x, y' = 3y$$



CP: _____

Stability: _____

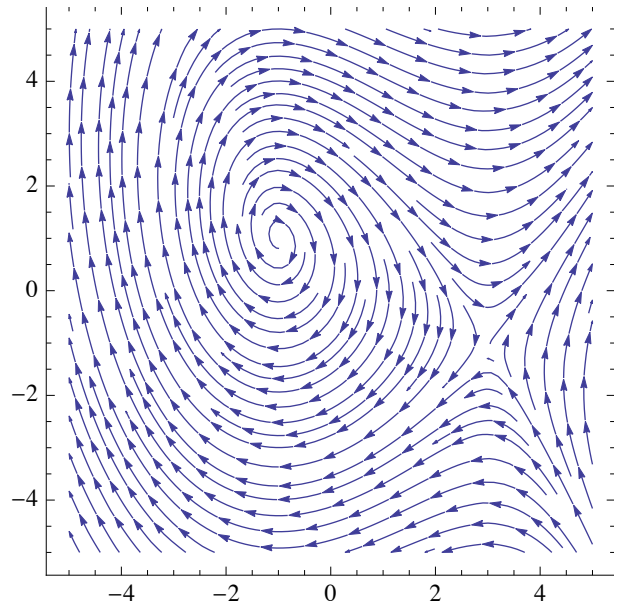
$$x' = x, y' = -y$$



CP: _____

Stability: _____

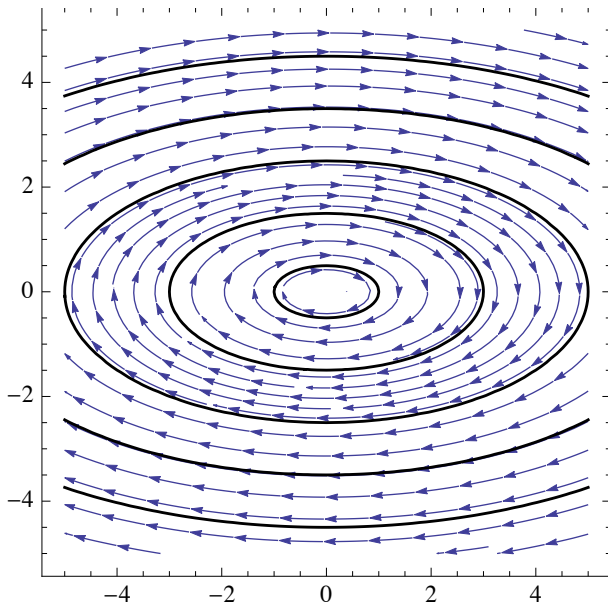
$$x' = 2y + x - 1, y' = x^2 - 2x - 3$$



CP: _____

Stability: _____

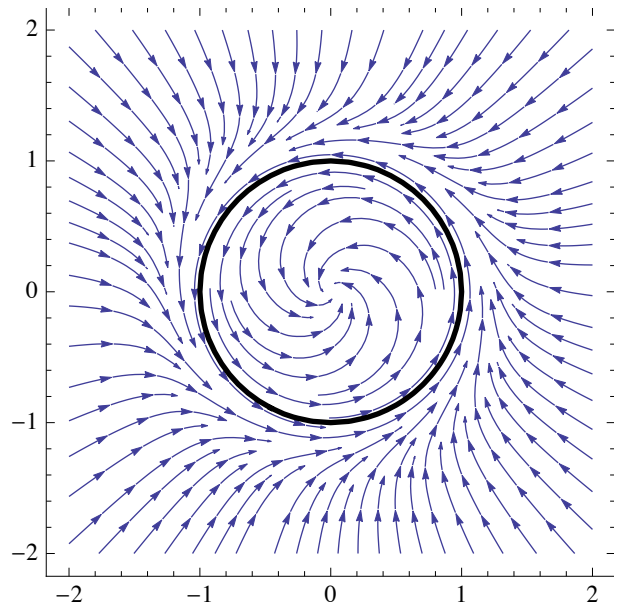
$$x' = 4y, y' = -x$$



CP: _____

Stability: _____

$$\begin{aligned} x' &= -y - x(1 - x^2 - y^2)^2 \\ y' &= x - y(1 - x^2 - y^2)^2 \end{aligned}$$



CP: _____

Stability: _____