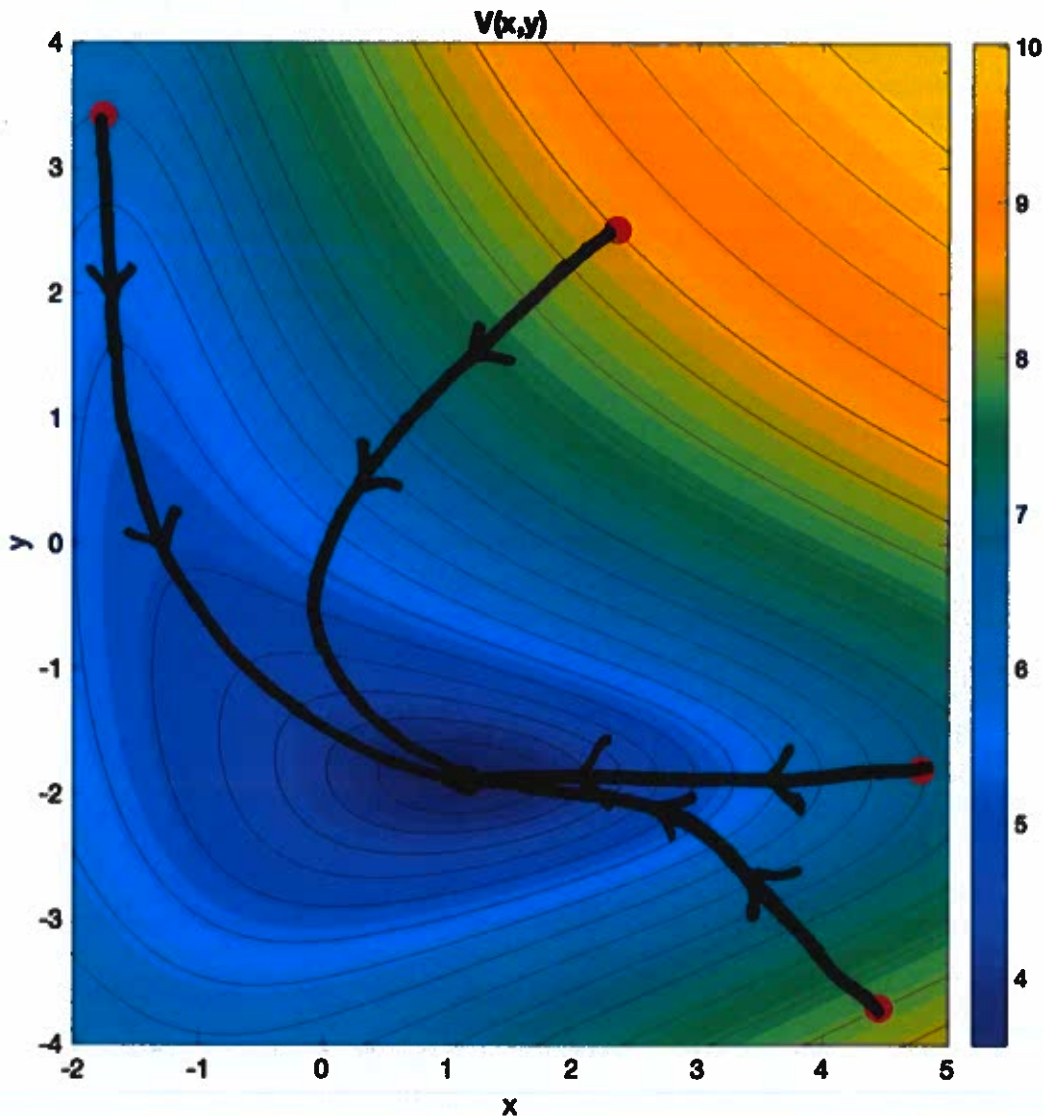


Problem 1. Consider the following system

$$\begin{aligned}\dot{x} &= -\frac{\partial V}{\partial x}, \\ \dot{y} &= -\frac{\partial V}{\partial y},\end{aligned}$$

Key

where a contour plot of $V(x, y)$ is shown below. The red dots are not part of the contour plot; rather, they represent initial conditions that will be used in part (b).



- (a) On the figure, indicate the approximate locations of any fixed points of the system.
- (b) For each of the four red dots, sketch a trajectory $(x(t), y(t))$ starting at that red dot at $t = 0$. Your sketches should clearly show the long-term behavior of each trajectory as $t \rightarrow \infty$.