

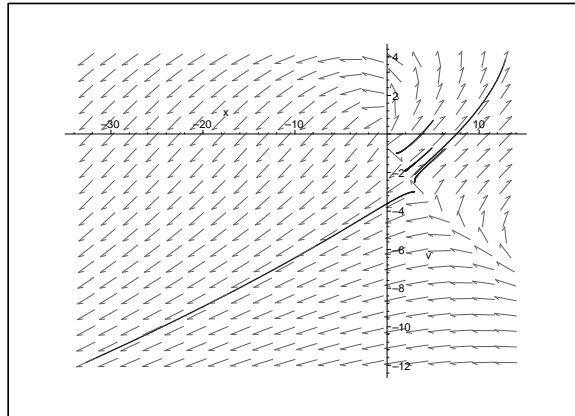
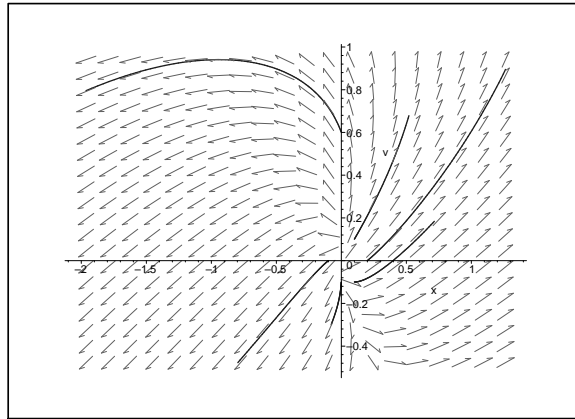
Phase Portraits for Linear Stability Analysis Examples

Example 1.

The system

$$\begin{aligned}x'(t) &= 2x(t) - v^2(t) \\v'(t) &= x(t) + v(t)\end{aligned}$$

has 2 critical points, the unstable node $(0, 0)$ and the saddle point $(2, -2)$. The phase diagrams below show a few trajectories in their vicinities.



Example 2.

The system

$$\begin{aligned}x'(t) &= x^2(t) + v^2(t) - 6 \\v'(t) &= x^2(t) - v(t)\end{aligned}$$

has 2 critical points, a saddle point at $(\sqrt{2}, 2)$ and a stable spiral at $(-\sqrt{2}, 2)$. Below are phase diagrams with a few trajectories local to each, and on the next page is a larger scale diagram that shows the interaction of the 2 critical points.

