Phase Portraits for Autonomous Systems

Plot an autonomous system of two ODEs, including the direction field, critical point(s), and phase portraits as desired.

▼ Instructions

- To begin, enter the necessary information into the fields below:
  - the bounds for the plot window
  - $F(x, y)$ and $G(x, y)$, the right-hand sides of the autonomous ODEs $\dot{x} = F(x, y)$ and $\dot{y} = G(x, y)$
  - one equilibrium (critical) point as a list $[a, b]$, and multiple such points in a sequence $[a, b]$, $[c, d]$
  - bounds for t, the independent variable of the ODEs, and hence, the parameter along orbits (trajectories or paths)
- Click the **Enter Data** button to obtain a direction field and all entered equilibrium (critical) points.

- Click on the plot area and select the Click and Drag Manipulator (⊹) from the Plot menu

  or plotting toolbar. Then click anywhere in the direction field to create a phase portrait through that point.
- The **Erase Phase Portrait** button erases all orbits and field arrows. The **Clear All** button clears every field in the template.

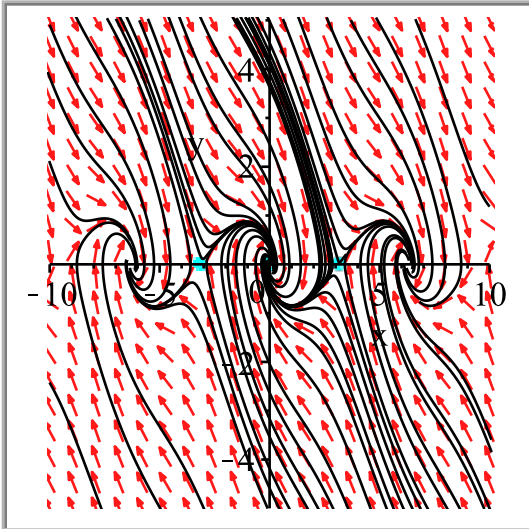### Phase Portraits for Autonomous Systems

Plot Window

-10 10

$\leq x \leq$,

-5 5

$\leq y \leq$

Differential Equations

$\dot{x} = F(x, y) =$

y

$\dot{y} = G(x, y) =$

$-\sin(x) - y$

Equilibrium (Critical) Points

Erase Phase...

Clear All

$[0, 0], [-\text{Pi}, 0], [\text{Pi}, 0]$

Parameter

-5 $\leq t \leq$ 5

Enter Data