

MA222- phase diagram worksheet - Rickert

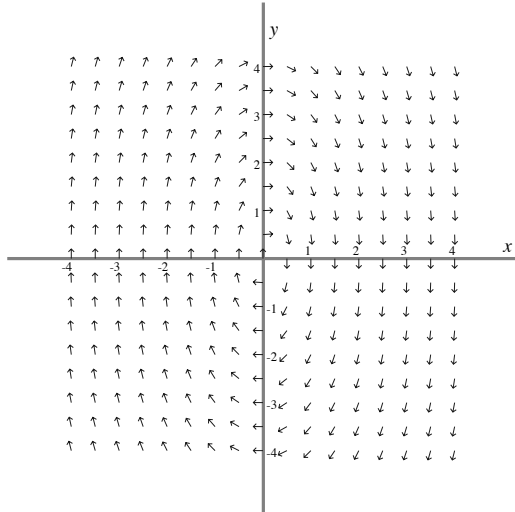
For each of the direction fields shown, plot the trajectory of the initial conditions. Be sure to label the trajectories.

(A)  $(2, 0)$

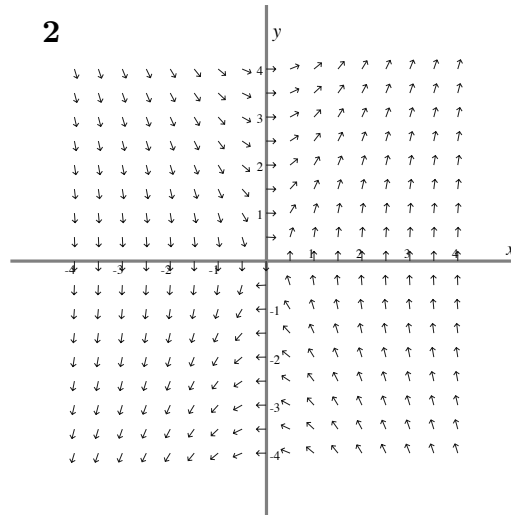
(B)  $(3, -1)$

(C)  $(-1, -1)$

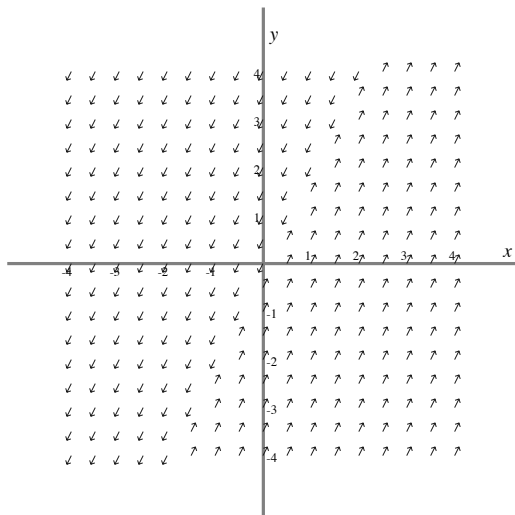
**1**



**2**



**3**



4 Suppose that a 50 gallon tank (tank U) initially contains 15 pounds of salt and that an adjoining 100 gallon tank (tank V) also initially contains 15 pounds of salt. The brine flows through a pipe from tank U to tank V at a rate of 4 gallons per minute, and through a separate pipe from tank V to tank U at a rate of 4 gallons per minute.

(A) Set up the initial value problem satisfied by the amount of salt in each of the tanks as a function of time  $t$ .

(B) Write the system in Matrix form.

(C) Plot the solution on a direction field.

Homework from the book: Section 8.2 #21; Section 8.4 #27,29.

Review facts about matrices.