

This is a take home quiz. Please write complete solutions (your own paper) to the following and turn in at the beginning of class on Friday.

1. Given the solution to $\mathbf{Y}' = A\mathbf{Y}$ for each matrix below. In the case of a single eigenvalue, use $\mathbf{v}_0 = (x_0, y_0)$.

(a) $A = \begin{bmatrix} 0 & -1 \\ -2 & 1 \end{bmatrix}$

(b) $A = \begin{bmatrix} -2 & -2 \\ 5 & 0 \end{bmatrix}$

(c) $A = \begin{bmatrix} 2 & 1 \\ -1 & 4 \end{bmatrix}$

2. For each system in question (1), sketch the Poincaré Diagram and locate the position of that system in the diagram, then classify the origin.
3. Using the Poincaré Diagram as a guide, discuss how changing a will change the classification of the origin.

$$\mathbf{Y}' = \begin{bmatrix} 2 & 1 \\ a & -3 \end{bmatrix} \mathbf{Y}$$

(For extra practice on these, see the HW for 3.7)