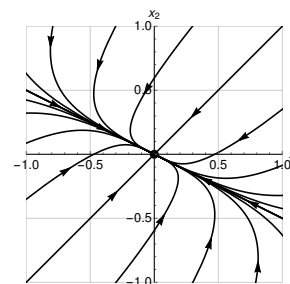


1. [12 points] Six matrices and their eigenvalues and eigenvectors are given below. Use this information to answer the questions below. Be sure that you explain your answers.

$\mathbf{A}_1$	$\mathbf{A}_2$	$\mathbf{A}_3$	$\mathbf{A}_4$	$\mathbf{A}_5$	$\mathbf{A}_6$
$\begin{pmatrix} -1 & 2 \\ -1 & -3 \end{pmatrix}$	$\begin{pmatrix} 2 & 2 \\ 1 & 3 \end{pmatrix}$	$\begin{pmatrix} -2 & 2 \\ 1 & -3 \end{pmatrix}$	$\begin{pmatrix} -1 & 3 \\ 2 & -2 \end{pmatrix}$	$\begin{pmatrix} -2 & -2 \\ -1 & -3 \end{pmatrix}$	$\begin{pmatrix} -3 & -1 \\ 1 & -1 \end{pmatrix}$
$\lambda_{1,2} = -2 \pm i$	$\lambda_{1,2} = 1, 4$	$\lambda_{1,2} = -4, -1$	$\lambda_{1,2} = -4, 1$	$\lambda_{1,2} = -4, -1$	$\lambda_{1,2} = -2, -2$
$\mathbf{v}_1 = \begin{pmatrix} 2 \\ -1 + i \end{pmatrix}$	$\mathbf{v}_1 = \begin{pmatrix} -2 \\ 1 \end{pmatrix}$	$\mathbf{v}_1 = \begin{pmatrix} -1 \\ 1 \end{pmatrix}$	$\mathbf{v}_1 = \begin{pmatrix} -1 \\ 1 \end{pmatrix}$	$\mathbf{v}_1 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$	$\mathbf{v}_1 = \begin{pmatrix} -1 \\ 1 \end{pmatrix}$
$\mathbf{v}_2 = \begin{pmatrix} 2 \\ -1 - i \end{pmatrix}$	$\mathbf{v}_2 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$	$\mathbf{v}_2 = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$	$\mathbf{v}_2 = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$	$\mathbf{v}_2 = \begin{pmatrix} -2 \\ 1 \end{pmatrix}$	$\mathbf{w} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

a. [6 points] Write a linear system involving one of the  $\mathbf{A}_j$  that could have the phase portrait shown to the right.



b. [6 points] Write a linear system involving one of the  $\mathbf{A}_j$  that could have the phase portrait shown to the right.

