

Linear Systems: Three Examples

Math 230

Use technology to compute the eigenvalues and eigenvectors of each of the following matrices. Write down the general solution to the system $\frac{d\mathbf{Y}}{dt} = \mathbf{A}\mathbf{Y}$. Then use the eigenvalues and eigenvectors (but not technology) to make a quick sketch of the phase portrait for the system.

1. $\mathbf{A} = \begin{bmatrix} 2 & 2 \\ 5 & -1 \end{bmatrix}$

2. $\mathbf{A} = \begin{bmatrix} 1 & -2 \\ 1 & 4 \end{bmatrix}$

3. $\mathbf{A} = \begin{bmatrix} -2 & 2 \\ 2 & -5 \end{bmatrix}$