

1. Let

$$A = \begin{bmatrix} 3 & -1 & 1 \\ 7 & -5 & 1 \\ 6 & -6 & 2 \end{bmatrix}$$

Which of the following are eigenvectors for A ? If one is an eigenvector, what is the corresponding eigenvalue?

a) $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$

b) $\begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$

c) $\begin{bmatrix} 2 \\ -1 \\ 3 \end{bmatrix}$

$$\begin{bmatrix} 3 & -1 & 1 \\ 7 & -5 & 1 \\ 6 & -6 & 2 \end{bmatrix} - \lambda \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$\lambda = -4$$

$$\det \begin{pmatrix} 3-\lambda & -1 & 1 \\ 7 & -5-\lambda & 1 \\ 6 & -6 & 2-\lambda \end{pmatrix}$$

$$\lambda = -4 =$$

$$\lambda = 2 = \begin{pmatrix} 1 & -1 & 1 \\ 7 & -7 & 1 \\ 6 & -6 & 0 \end{pmatrix}$$

$$3-\lambda \det \begin{pmatrix} -5-\lambda & 1 \\ -6 & 2-\lambda \end{pmatrix} = \lambda^2 + 3\lambda - 4$$

$$-1 \det \begin{pmatrix} 7 & 1 \\ 6 & 2-\lambda \end{pmatrix} = -7\lambda + 8$$

$$1 \det \begin{pmatrix} 7 & -5-\lambda \\ 6 & -6 \end{pmatrix} = 6\lambda - 12$$

$$-\lambda^3 + 3\lambda^2 - 4\lambda + 3\lambda^2 + 6\lambda - 12 + 7\lambda + 8 + 6\lambda - 12$$

$$= -\lambda^3 + 12\lambda - 16$$

$$\lambda = 2, -4$$

2. What is the characteristic polynomial of the matrix

$$A = \begin{bmatrix} 3 & -4 \\ 2 & -6 \end{bmatrix}?$$

$$\begin{pmatrix} 3 & -4 \\ 2 & -6 \end{pmatrix} - \lambda \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$$

$$\det \begin{pmatrix} 3-\lambda & -4 \\ 2 & -6-\lambda \end{pmatrix} = -18 - 3\lambda + 6\lambda + \lambda^2 + 8$$

$$= \lambda^2 + 6\lambda - 10$$

Cole Hensley

Quiz 10

scrap paper

$$\lambda = 2$$

$$\begin{bmatrix} 1 & -1 & 1 \\ 7 & -7 & 1 \\ 6 & -6 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 7 & -7 & 1 \\ 1 & -1 & 1 \\ 6 & -6 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 7 & -7 & 1 \\ 0 & 0 & \frac{6}{7} \\ 0 & 0 & -\frac{6}{7} \end{bmatrix}$$

$$\begin{bmatrix} 7 & -7 & 1 \\ 0 & 0 & \frac{6}{7} \\ 0 & 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 7 & -7 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\begin{aligned} x - y &= 0 \\ z &= 0 \\ x &= y \end{aligned}$$

$$\begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}$$

none

$$\lambda = -4$$

$$\begin{bmatrix} 7 & -1 & 1 \\ 7 & -1 & 1 \\ 6 & -6 & 6 \end{bmatrix}$$

$$\begin{bmatrix} 7 & -1 & 1 \\ 6 & 0 & 0 \\ 6 & -6 & 6 \end{bmatrix}$$

$$\begin{bmatrix} 7 & -1 & 1 \\ 0 & 0 & 0 \\ 0 & -\frac{36}{7} & \frac{36}{7} \end{bmatrix}$$

$$\begin{bmatrix} 7 & -1 & 1 \\ 0 & 0 & 0 \\ 0 & 1 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 7 & -1 & 1 \\ 0 & 1 & -1 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 7 & 0 & 0 \\ 0 & 1 & -1 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & -1 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\begin{aligned} x &= 0 \\ y - z &= 0 \end{aligned}$$

$$\begin{pmatrix} 0 \\ 1 \\ 1 \end{pmatrix}$$