Linear Algebra Workbook

Eigenvalues and Eigenvectors

krista king MATH

EIGENVALUES, EIGENVECTORS, EIGENSPACES

■ 1. Find the eigenvalues of the transformation matrix A.

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

■ 2. For the transformation matrix A, find the eigenvectors associated with each eigenvalue, $\lambda = -2$ and $\lambda = -5$.

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

$$\lambda I_n - A = \begin{bmatrix} \lambda + 2 & -2 \\ 0 & \lambda + 5 \end{bmatrix}$$

■ 3. Find the eigenvalues of the transformation matrix A.

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

■ 4. For the transformation matrix A, find the eigenvectors associated with each eigenvalue, $\lambda = -2$ and $\lambda = 4$.

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

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$$\lambda I_n - A = \begin{bmatrix} \lambda - 3 & 1 \\ 5 & \lambda + 1 \end{bmatrix}$$

5. Find the eigenvectors of the transformation matrix.

$$A = \begin{bmatrix} 5 & 0 \\ -4 & 3 \end{bmatrix}$$

6. Find the eigenvectors of the transformation matrix.

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

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EIGEN IN THREE DIMENSIONS

1. Find the eigenvectors of the transformation matrix A.

$$A = \begin{bmatrix} -2 & 4 & 3 \\ 0 & 1 & 0 \\ 0 & 0 & -5 \end{bmatrix}$$

2. Find the eigenvectors of the transformation matrix A.

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

3. Find the eigenvectors of the transformation matrix A.

$$A = \begin{bmatrix} -3 & 0 & 0 \\ -4 & 1 & 0 \\ 0 & 5 & 2 \end{bmatrix}$$

4. Find the eigenvectors of the transformation matrix A.

$$A = \begin{bmatrix} 4 & 0 & 0 \\ -2 & -3 & 0 \\ 3 & 1 & -5 \end{bmatrix}$$

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5. Find the eigenvectors of the transformation matrix A.

$$A = \begin{bmatrix} 1 & 2 & 0 \\ 2 & 1 & 0 \\ 0 & 0 & -3 \end{bmatrix}$$

6. Find the eigenvectors of the transformation matrix A.

$$A = \begin{bmatrix} -4 & 3 & 0 \\ 3 & -4 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

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