

Eigenvalues & Eigenvectors

LESSON 7.1

DEFINITION

Let A be $n \times n$. The scalar λ is called an **eigenvalue** of A if there exists a nonzero vector \mathbf{x} such that $A\mathbf{x} = \lambda\mathbf{x}$. The vector \mathbf{x} is called the **eigenvector** of A corresponding to λ .

EXAMPLE

Let $A = \begin{bmatrix} 1 & -2 & 1 \\ 0 & 0 & 0 \\ 0 & 1 & 1 \end{bmatrix}$. Verify that $\mathbf{x}_1 = \begin{bmatrix} -3 \\ -1 \\ 1 \end{bmatrix}$ and $\mathbf{x}_2 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ are eigenvectors of A and find their corresponding eigenvalues.