KUTAISI INTERNATIONAL UNIVERSITY

Quiz (G-9)

Linear Algebra for Informatics
Fall semester 2024
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Definition

Consider an eigenvalue λ of an $n \times n$ matrix A. Then the kernel of the matrix $A - \lambda I_n$ is called the *eigenspace* associated with λ, denoted by E_λ :

$$E_\lambda = \ker(A - \lambda I_n) = \{\vec{v} \in \mathbb{R}^n : A\vec{v} = \lambda\vec{v}\}$$

Problem

Find the eigenspaces of the matrix $A = \begin{pmatrix} 1 & 2 \\ 4 & 3 \end{pmatrix}$. Diagonalize matrix A if you can..

Problem

Which of the following statements are true?..(Explain why)

- **(S1)** Every 2×2 matrix has an eigenvector
- **(S2)** if A and B are two $n \times n$ matrices such that $AB = BA$, and if u is an eigenvector of B, then Au is an eigenvector of B as well
- **(S3)** if u and v are the eigenvectors of a 2×2 matrix A, then $u - v$ is also an eigenvector of A