

Ch8 Definition

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Definition 8.1 Eigenvectors and eigenvalues

- Eigenvectors of A
 - non-zero
 - exists λ scalar s.t. $A\vec{x} = \lambda\vec{x}$
- Eigenvalue is λ .

Definition 8.3 λ -eigenspace (2. eigenspace $\Rightarrow \lambda=2$)

- $E_\lambda := \text{Nul}(A - \lambda I)$
- All eigenvectors with corresponding λ .
- Set of $\vec{x} \in \mathbb{R}^n$ s.t. T_A stretches \vec{x} by factor λ .

Definition 8.5 Geometric Multiplicity

- defined to be $\dim(E_\lambda)$

Definition 8.6 Characteristic Polynomial

- $\chi_A(x) = \det(A - xI_n)$

Definition 8.9

Factorization of f : $(x - \alpha_1)^{m_1} \cdots (x - \alpha_k)^{m_k}$ ($m_1 + \cdots + m_k = n$)

Roots: $\alpha_1, \alpha_2, \dots, \alpha_k$. (complex numbers)

Algebraic Multiplicity: m_i (for each α_i)