

L^AT_EX exam

Name Surname

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Chapter 1

Algebra

1.1 Matrix Theory

Theorem 1.1.1. [1] *Let A be an $n \times n$ matrix. Then, A is invertible iff $\det A \neq 0$. In this case*

$$\det(A^{-1}) = \frac{1}{\det A}$$

Definition 1.1.1. [1] *Let A be an $n \times n$ matrix*

$$A = \begin{pmatrix} a_{11} & \dots & a_{1n} \\ \vdots & \vdots & \vdots \\ a_{n1} & \dots & a_{nn} \end{pmatrix} \quad (1.1)$$

Its characteristic polynomial is defined as

$$p(\lambda) = \det(\lambda I - A) \quad (1.2)$$

Theorem 1.1.2. *For every square matrix A , and its characteristic polynomial $p(\lambda)$, as defined in 1.2, it holds*

$$p(A) = 0$$

Proof.

$$p(A) = \det(A * I - A) = \det(0_n) = 0$$

□

Bibliography

- [1] Dennis S. Bernstein, Matrix mathematics. Theory, facts, and formulas. 2nd expanded ed., Princeton University Press 2009.