

The Fundamental Theorem of Invertible Matrices

Let A be an $n \times n$ matrix. The following statements are equivalent:

- a. A is invertible.
- b. $A\mathbf{x} = \mathbf{b}$ has a unique solution for every \mathbf{b} in \mathbb{R}^n .
- c. $A\mathbf{x} = \mathbf{0}$ has only the trivial solution.
- d. The RREF of A is I_n .
- e. A is a product of elementary matrices.