(ENKEMNA0302) Applied Linear Algebra

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LU Decomposition

- Definition: (LU Decomposition). We say that an $m \times n$ matrix $\mathbf{A}$ has an LU decomposition (LU factorization or LU decomposition) if it can be written as $\mathbf{A} = \mathbf{LU}$, where $\mathbf{L}$ is a lower unit triangular matrix (i.e., ones on the main diagonal and zeros above it) and $\mathbf{U}$ is an upper triangular matrix.
- Not every matrix has an LU decomposition.
- The LU decomposition is not unique.
- However, it can be shown that if $\mathbf{A}$ is invertible and has an LU decomposition, then it is unique.
- Example of computing an LU decomposition, Algorithm for constructing an LU decomposition, Existence and uniqueness of the LU decomposition, Solving a system of equations using LU decomposition, + example, Inverting a matrix using LU decomposition, + example...

The End

Thank you for your attention!