LDU Factorizations

1 Why

The *LDU factorization* of a positive definite matrix is a decomposition of a symmetric permutation of the matrix as a product of a unit lower triangular, a positive diagonal, and a unit upper triangular matrix.

2 Notation

A LDL decomposition of $A \in \mathbf{S}^n_{++}$ is to write

$$P_\sigma A P_\sigma^\top = LDL^\top$$

where L is unit lower triangular, D is positive diagonal, and σ is a permutation of $\{1, 2, \ldots, n\}$.