1. Use Gaussian elimination to find the LU factorization of

(a) 

\[ A = \begin{bmatrix} 1 & 1/2 & 1/3 \\ 1/2 & 1/3 & 1/4 \\ 1/3 & 1/4 & 1/5 \end{bmatrix} \]

(without pivoting)

(b) 

\[ A = \begin{bmatrix} 2 & 2 & 4 \\ 1 & 1 & -3 \\ -1 & 1 & 1 \end{bmatrix} \]

(with pivoting)

2. (551): Suppose the \( m \times m \) matrix \( A \) has a partitioning

\[ A = \begin{bmatrix} A_{11} & A_{12} \\ A_{21} & A_{22} \end{bmatrix} \]

where \( A_{11} \) is a non-singular \( n \times n \) matrix and \( A_{22} \) is \( (m - n) \times (m - n) \). Find the block LU factorization of the matrix \( A \). Verify your answer by multiplying \( LU \) to get \( A \). Note that the resulting \( U_{22} \) is known as the Schur complement of \( A_{11} \) in \( A \).

3. TB #21.1

4. TB #23.1