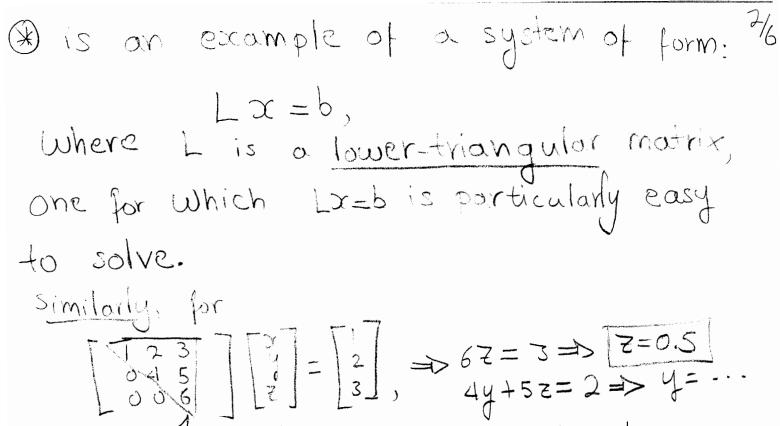
Appendix A. Moirix Fadorizations (p.600-603) Permutation modices Consider [] o [a] = [a] swaps x, x x_2 Now, for $\begin{bmatrix} x \\ y \end{bmatrix}$, we will have: $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} x \\ x \\ y \end{bmatrix} = \begin{bmatrix} x \\ y \\ y \end{bmatrix}$ grab z for y get 21. Thus, for permutation matrices, we permute the rows of the identity matrix to the desired order. We use P to identify permutation matrices Triangular Matrices. Consider Too [x] = [o]

Triangle

triangle

Triangle

 $x = b_1$, $x + 2y = b_2 = b_3 - 2y - x = ...$



Similarly, for

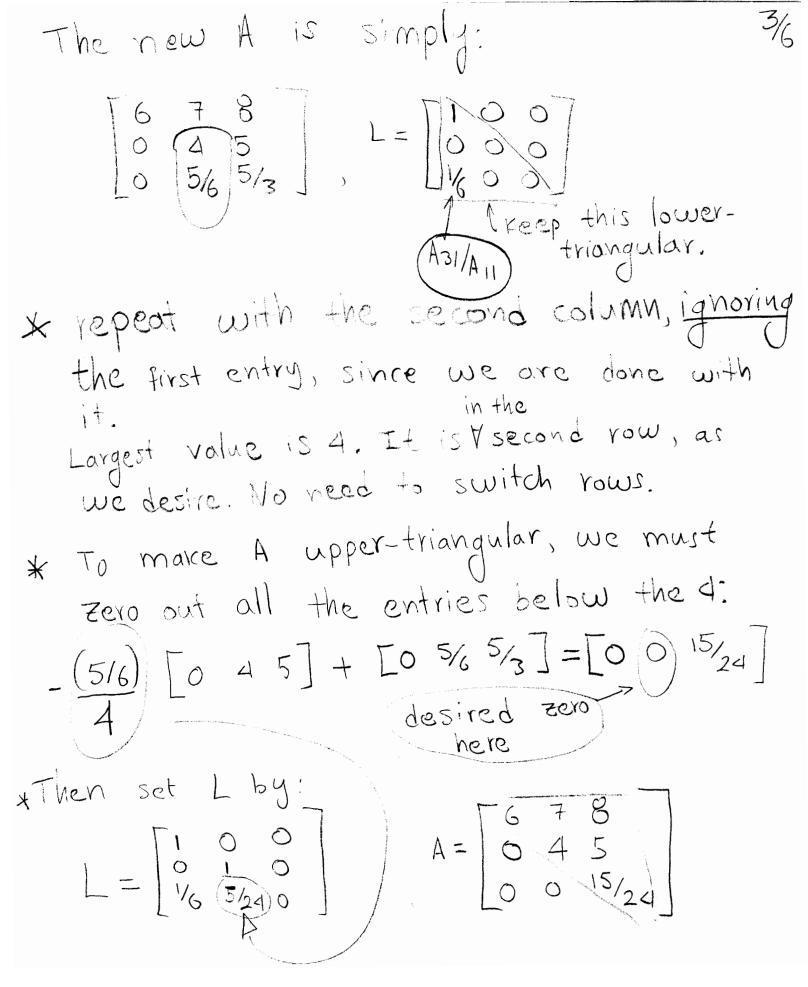
\[\begin{align*} & \lefta & \frac{7}{2} & \lefta & \frac{7}{2} & \fra

Factorizations
The LU factorization is PA = LU.

The LU factorization is PA = LU.

To solve Ax = b, multiply by P on

both sides: PAx = Pb Ax = Pb



To compute PA=LU, we use algorithm A.1 to compute P, L, U from A. Basic idea: De Compute PA=LU by converting A to 1 Let $A = \begin{bmatrix} 0 & 2 & 3 \\ 0 & 7 & 9 \end{bmatrix}$ Start with: $P = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$; $L = 0_{3\times3}$ matrix. * Start with the first column of A, and find the largest element: 6. * swap with the first row for both A&P $A = \begin{bmatrix} 6 & 7 & 8 \\ 0 & 4 & 5 \\ 1 & 2 & 3 \end{bmatrix}, P = \begin{bmatrix} 0 & 0 & D \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ * Zero-out all the entries below: multiply the first & by Azı / Aıı and subtract it from the third:

* Final output is simply: The Gaussian elimination algorithm is given as A.I., but lix the swap step to swap rows i and J of matrices A and P.

Swap rows i and J of matrices A and P. The algorithm becomes significantly simpler if A is positive definite.

We have A = LLT or $\left(P = T, U = LT\right)$.

Alanithm 4.2 (Cholesky factorijation) Given A = Rnxn symmetric positive definite: for i=1,2,...,n Lii = VAii for j=i+1, i+2, ..., n LJi = Azi/Lii = multiplier for k=i+1, i+2, ..., J = note the simplifications.

(AJK = AJK - LJiLKi due to symmetry end end

end

To solve Ax=b: $\begin{cases} \frac{50\text{lve}}{2} \\ \frac{1}{2} = b \end{cases}$ or $\begin{cases} \frac{50\text{lve}}{2} \\ \frac{1}{2} = b \end{cases}$ for $\frac{1}{2}$.