

# HOMEWORK LEC 03      MATRIX ANALYSIS

2020

- 1) Write a sequence of elements to ~~the~~ transform a  $4 \times 4$  matrix  $A$  into a lower triangular matrix via column operations.   
 (create a  $4 \times 4$  matrix)
- 2) Show that transposition does not alter the rank of a matrix. Consider  $3 \times 3$  generic matrix  $A = [a_{ij}]$  matrices for simplicity.
- 3) Show how to implement discrete convolution via matrix-vector product: input vector  $X^T = [x_1, x_2, x_3]$ , impulse response:  $h^T = [h_1, h_2]$    
 Causal system
- 4) Create a  $4 \times 4$  consistent lin sys and solve via LU factorization. At each stage perform pivoting so that pivots are always the largest numbers over each column. Show how to obtain  $P$ .   
 Numerical Example
- 5) Create: (Numerical example)
  - a) A  $4 \times 4$  Matrix that has different LU factors;
  - b) A rectangular ( $N, M \geq 3$ ) Matrix that has a unique LU factorization;

Examples in pages 17, 18 back; of this LEC Notes