



### Class Work

#### A. Programming Exercises (Matlab)

1. Find the least squares solution for the following system:

$$A = \begin{bmatrix} 2 & 1 \\ 3 & 5 \\ 2.2 & -1.1 \\ 4 & 3.1 \end{bmatrix}, B = \begin{bmatrix} -1.1 \\ 2.3 \\ -4.2 \\ 5.1 \end{bmatrix}$$

- Using left inverse
  - Using SVD decomposition
  - Using \ operator
  - Using pinv
2. Find the least norm solution for the following system:

$$A = \begin{bmatrix} 3 & 2 & -2 & -1 \\ 1 & 0.3 & 1 & 5 \end{bmatrix}, B = \begin{bmatrix} -1.3 \\ 2.7 \end{bmatrix}$$

- Using right inverse
- Using SVD decomposition
- Using \ operator (Is the result a solution? Is this solution the least norm solution?)
- Using pinv

#### B. Paper Homework

- Show that for any square nonsingular matrix:  $A^{-1} = A^{\dagger} = A^{ri}$
- Prove that:  $A^{-1} = V \left[ \text{diag} (1/ s_i) \right] U^T$

### Home Work

#### A. Programming Exercises (Matlab)

- Write a function *myNorm* that receives the same inputs as the function *norm* in Matlab and generates the same output

#### B. Paper Homework

- Find by hand the least square solution for the system

$$A = \begin{bmatrix} 2 & 1 \\ 3 & 5 \\ 2.3 & -1 \\ 4 & 0 \end{bmatrix}, B = \begin{bmatrix} -1.1 \\ 5 \\ -4.2 \\ 5.1 \end{bmatrix}$$