Week 10 Outline

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2019-10-08

1 Review

Given a tall matrix A,

1.1 QR

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1.2 Left inverse and system of equations

$$Ax = b \tag{1}$$

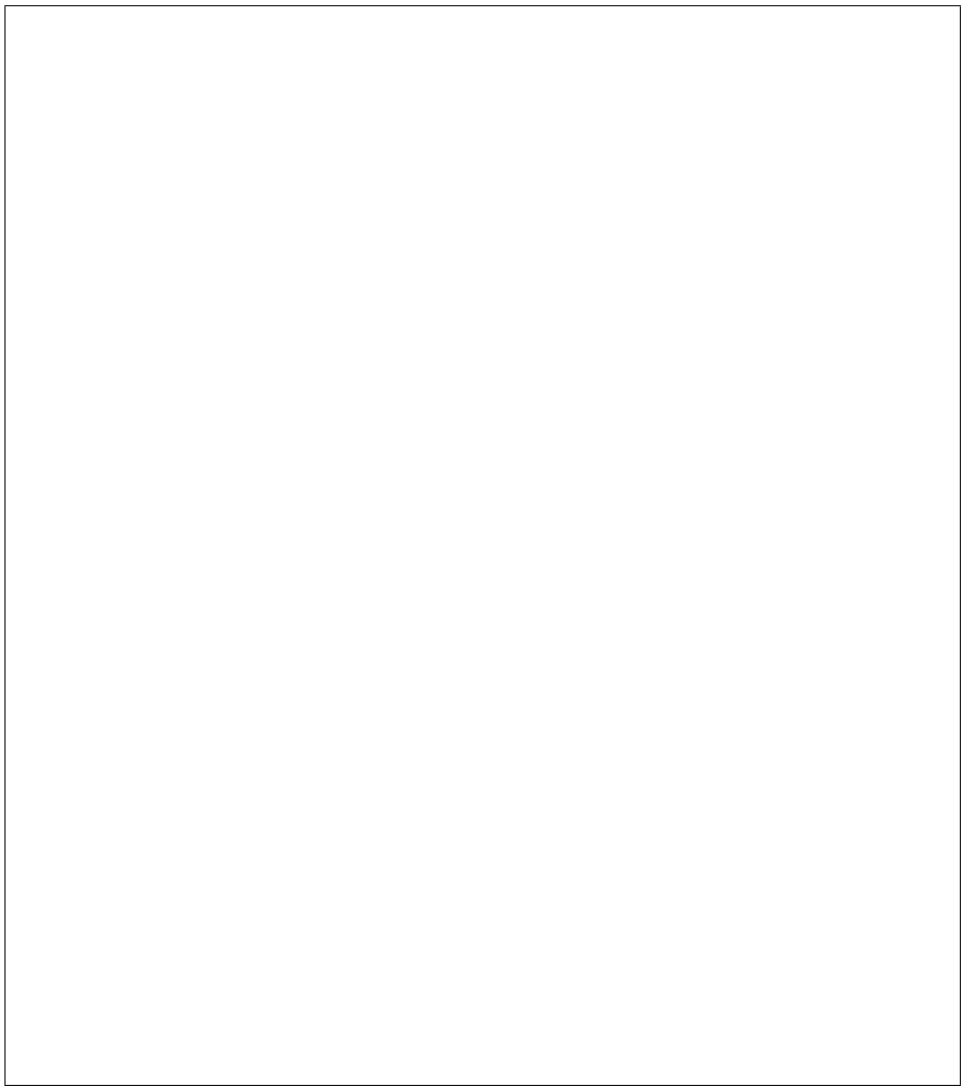
Practice for matrix multiplications, Given tall matrix A, write $A^{\dagger}$ in terms of Q, R.

1.3 Least Square

Motivation for least square:

2 Problem 2: Least square and QR factorization

3 Problem 1: Weighted least squares



4 Problem 3: Invertibility of matrix

Normal equations: $A^T A\hat{x} = A^T b$.

$$\begin{bmatrix} 0 & A^T \\ A & I \end{bmatrix} \begin{bmatrix} \hat{x} \\ \hat{y} \end{bmatrix} = \begin{bmatrix} 0 \\ b \end{bmatrix} \tag{2}$$