

Math 2601 C2
Homework 6

Please do all three of the following problems and email me if you need any assistance (mullikin@math.gatech.edu). The problems are to be turned in Friday Feb 23, 2001 at 2:05pm. Please, staple your work if it is more than one page. Also, please write neatly. If I can't read your work, I can't give you any credit.

Problem 1 Let $A = \begin{pmatrix} 1 & 0 & 2 \\ 2 & 2 & 1 \\ 3 & 2 & 3 \end{pmatrix}$.

i) Find the QR factorization of A .

ii) Find the orthogonal projection P onto the column space of A .

iii) Find the orthogonal projection P^\perp onto the complement of the column space of A .

Problem 2 Let $B = \begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{pmatrix}$.

i) Find the QR factorization of B .

ii) Find the least square solution to $B\vec{x} = \vec{b}$ with

$$\vec{b} := \begin{pmatrix} 1 \\ 2 \\ 3 \\ 1 \end{pmatrix}$$

iii) Find the least square solution to $B\vec{x} = \vec{c}$ with

$$\vec{c} := \begin{pmatrix} 1 \\ 0 \\ -1 \\ 0 \end{pmatrix}$$

Problem 3 Let $C = \begin{pmatrix} 2 & -1 & 1 & 0 \\ 1 & 1 & 1 & 1 \end{pmatrix}$. Find the minimal length solution to $C\vec{x} = \begin{pmatrix} 3 \\ 0 \end{pmatrix}$.