Linear Algebra
Spring 2024

Assignment 10.1
Due April 1

Exercise 1. Let

$$Q = \frac{1}{\sqrt{3}} \begin{pmatrix} 1 & -1 & 0 \\ 0 & 1 & 1 \\ 1 & 1 & -1 \\ -1 & 0 & -1 \end{pmatrix}.$$

a. Verify that Q has orthonormal columns by computing $Q^T Q$.

b. Let $\mathbf{b} = (1\ 2\ 3\ 4)^T$. Find the least squares solution to the (unsolvable) equation $Qx = \mathbf{b}$.

Exercise 2. Textbook exercise 4.4.2.

Exercise 3. Textbook exercise 4.4.3.

Exercise 4. Textbook exercise 4.4.5.

Exercise 5. Textbook exercise 4.4.9.