UCLA Math 33A − Practice Problems

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Last updated February 23, 2023

A list of practice problems for UCLA Math 33A. Solutions are provided in a separate document on my webpage. Please feel free to email me if you there is a topic you would like me to add to this list.

1. Find all $\mathbf{x} \in \mathbb{R}^4$ orthogonal to the vector space

$$V = \operatorname{span}\left\{ \begin{pmatrix} 2 \\ 1 \\ 0 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ 4 \\ 3 \end{pmatrix} \right\}.$$

2. Find a basis of the $V^\perp$ if

$$V = \operatorname{span}\left\{ \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix} \right\}.$$

3. Let $A = \begin{pmatrix} 1 & 1 \\ 1 & 2 \\ 0 & 1 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 6 \\ 3 \\ 1 \end{pmatrix}$.

    (a) Show that the matrix system $A\mathbf{x} = \mathbf{b}$ has no solution.

    (b) Find the least squares solution $\mathbf{x}^*$ to $A\mathbf{x} = \mathbf{b}$.