

Review for quiz 3

2025-11-12

We have our third quiz next Wednesday, November 19th. Here's our review sheet for that quiz.

The problems

1. Write down the definition of each of the following:

- a. Orthogonal vectors [Def 6.1.7](#)
- b. Orthonormal set of vectors [Def 6.3.6](#)
- c. Orthogonal matrix [Def 6.3.22](#)
- d. Orthogonal projection [Definition 6.3.12](#)

2. Let $\mathbf{u}$ and $\mathbf{v}$ denote the 3D vectors

$$\mathbf{u} = \begin{bmatrix} 2 \\ -1 \\ 1 \end{bmatrix} \quad \text{and} \quad \mathbf{v} = \begin{bmatrix} 1 \\ 3 \\ -1 \end{bmatrix}.$$

- a. Verify that $\mathbf{u}$ and $\mathbf{v}$ are orthogonal.
- b. Find the matrix P that projects orthogonally onto the subspace spanned by $\mathbf{u}$ and $\mathbf{v}$.

I guess you might consider using the technique outlined in [Proposition 6.3.16](#)

3. Use the normal equations to find the least squares regression line for the points

$$\{(-1, -1), (0, 1), (2, 0)\}.$$