Week 9 Day 3

Reflect

Make sure you know your neighbors' names. Then take about 2 minutes to discuss:

What are some topics from this class that you think you understand well? What are some topics that you think you need more practice with? Do you have a plan for practicing those topics?

Next Week

- ► Monday: Review.
  - ► Please submit requests via the Google Form linked on Canvas!
- ► Wednesday and Friday: No class.
  - ► Instead, I'll have office hours 10am–1pm (at the usual location, ie, UCSD Town Square*).
- ► Saturday: Final exam 3–6pm.

Gram-Schmidt Process

1. Find an orthogonal basis for

$$U = \text{span} \left\{ \begin{bmatrix} 3 \\ 1 \\ -1 \\ 3 \end{bmatrix}, \begin{bmatrix} -5 \\ 1 \\ 5 \\ -7 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ -2 \\ 8 \end{bmatrix} \right\}.$$

2. On $\mathbb{P}_2$, consider the inner product

$$\langle p, q \rangle = \int_0^1 p(t)q(t)\,dt.$$

Find an orthogonal basis for $\mathbb{P}_2$.

3. The matrix Q is obtained from the matrix A below by applying the Gram-Schmidt process to the columns of A. Find the QR factorization of A.

$$A = \begin{bmatrix} 5 & 9 \\ 1 & 7 \\ -3 & -5 \\ 1 & 5 \end{bmatrix}, \quad Q = \begin{bmatrix} 5/6 & -1/6 \\ 1/6 & 5/6 \\ -3/6 & 1/6 \\ 1/6 & 3/6 \end{bmatrix}$$