Announcements April 15

- Quiz on 6.1 and 6.2 in class today
- One more WebWork assignment and Written Homework next week
- Final Exam Wed May 4 8:00-10:50 (Sec H) and Mon May 2 2:50-5:40 (Sec J)
- Office Hours Tue 2-3 and Wed 2-3
- LA Office Hours: Scott Mon 12-1, Yashvi Mon 2-3, Shivang Tue 5-6, Baishen Wed 4-5, Matt Thu 3-4
- Math Lab, Clough 280
    - Regular hours: Mon/Wed 11-5 and Tue/Thu 11-5
    - Math 1553 hours: Mon-Thu 5-6 and Tue/Thu 11-12
    - LA hours: Matt Tue 11-12, Scott Tue 5-6, Baishen Thu 11-12, Yashvi/Shivang Thu 5-6

Orthogonal projection

Find A so that T_A is orthogonal projection onto

$$W = \text{Span}\left\{ \begin{pmatrix} 1 \\ 1 \\ -1 \end{pmatrix}, \begin{pmatrix} 3 \\ -1 \\ 2 \end{pmatrix} \right\}$$

Find B so that T_B is orthogonal projection onto

$$L = \text{Span}\left\{ \begin{pmatrix} 1 \\ 1 \\ -1 \end{pmatrix} \right\}$$

Answer the following questions (without calculation!).

1. What are A^2 and B^2?
2. What are A^{-1} and B^{-1}?
3. What are AB and BA?
4. Is A or B diagonalizable?
5. What are the eigenvalues of A and B (with algebraic multiplicity)?
6. Is A similar to B?

Best approximation

$W =$ subspace of $\mathbb{R}^n$

Fact. The projection y_W is the point in W closest to y. In other words:

$$\|y - y_w\| < \|y - w\|$$

for any w in W other than y_w.

Why?

Best approximation

Problem. Find the distance from e_1 to $W = \text{Span}\left\{\begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}\right\}$.

Find a best "solution" to $Ax = e_1$ where

$$A = \begin{pmatrix} 1 & 1 \\ 0 & 1 \\ -1 & 1 \end{pmatrix}$$