# Homework 7

**June 17**

1. 5.1.36 (Hint: this has essentially nothing to do with norms).

   We didn't have time to discuss the idea of normalizing in class, so we will do a few problems to practice the idea. Do the following series of problems:

2. Prove that if $S = \{\mathbf{v}_1, \ldots, \mathbf{v}_k\}$ is an orthogonal set and $c$ is a nonzero scalar then $S = \{\mathbf{v_1}, \ldots, c\mathbf{v_i}, \ldots, \mathbf{v_k}\}$ is a set of orthogonal set.

   The process of normalization is to change a orthogonal set $S = \{\mathbf{v}_1, \ldots, \mathbf{v}_k\}$ into an orthonormal set $S' = \{\mathbf{v'}_1, \ldots, \mathbf{v'}_k\}$ where the $\mathbf{v'_i}$ are nonzero if $\mathbf{v_i}$ is, each of the $\mathbf{v'_i}$ are unit vectors, and $\{\mathbf{v_i}, \mathbf{v'_i}\}$ are linearly dependent (i.e. one is a multiple of the other). The process is done by iterating the theorem in part $a$. Look at Example 5.6 in the book for an example to follow.

3. 5.1.11 and 5.1.12 to normalize those orthogonal sets (unless they already are orthogonal.

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4. 5.1.17

5. 5.1.26

6. 5.2.14

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7. 5.3.6

8. 5.3.10

9. 5.3.12 (I didn't do an example like this, but it follows example 5.14 in the text)