AMCS 602
Problem set 2 due September 13, 2016
Dr. Epstein

Reading: Page numbers below refer to *Numerical Linear Algebra* by Trefethen and Bau.

Standard problems: The following problems should be done, but do not have to be handed in.

1. Page 31, problem 4.1 (You can use a computer to do the arithmetic, but don't just use an SVD routine.)

2. Page 31, problems 4.3, 4.5.

3. Page 37, problem 5.1.

4. Page 47, problems 6.2, 6.3.

Homework assignment: The solutions to the following problems should be carefully written up and handed in.

1. Page 31, problem, 4.2.

2. By considering 2×2 matrices explore the relationship between the eigenvalues of a matrix and its singular values. In particular, determine when there is a simple relationship between these two sets of numbers, and when there is not.

3. Page 37, problem 5.2.

4. Page 37, problem 5.3.

5. Page 37, problem 5.4.

6. Page 47, problem 6.1. Give a geometric interpretation for $2P - I$, rather than $I - 2P$.

7. Page 47, problem 6.4.

8. Page 47, problem 6.5.

9. Prove Theorem 5.9 (on page 36). Hint: Show that you can reduce to the case that B is a diagonal matrix. This will involve changing A, but in a way that preserves its principal values, which are all that appear in the statement of the theorem.