Assignment #4

Due Monday, 5 October, 2015 at the start of class

Please read Lectures 3, 4, 5, and 6 in the textbook *Numerical Linear Algebra* by Trefethen and Bau. Do these exercises:

P9.   Suppose $A \in \mathbb{C}^{m \times n}$ has rank r. Use Theorem 5.3 to show the two inequalities
$$\|A\|_2 \le \|A\|_F \le \sqrt{r}\|A\|_2.$$
Also, find a 4×4 matrix A for which $\|A\|_F = 2\|A\|_2$.

Exercise 3.2 in Lecture 3.

Exercise 3.3 in Lecture 3.   Do parts (c) and (d).

Exercise 4.1 in Lecture 4.

Exercise 4.4 in Lecture 4.

Exercise 5.2 in Lecture 5.   *Note*: This is a *constructive* exercise. That is, given $A \in \mathbb{C}^{m \times n}$, construct a sequence of matrices $A_j \in \mathbb{C}^{m \times n}$ so that $\|A - A_j\|_2 \to 0$ as $j \to \infty$. Also, you do not need to know the definition of "dense" here, as that word is only used in an observation about topological meaning.