Assignment 8 Due December 5 Covers: Sections 5.2,6.2-6.3

- Q1. Do Question 8 of Section 6.1 in the textbook.
- Q2. Do Question 11 of Section 6.1 in the textbook.
- Q3. Do Question 4 of Section 6.2 in the textbook.
- Q4. Do Question 13(a) of Section 6.2 in the textbook. (**Hint:** Use Theorem 6 from the Week 9 notes).
- Q5. Do Question 17(bc) of Section 6.2 of the textbook.
- Q6. Do Question 18(b) of Section 6.2 of the textbook.
- Q7. Do Question 2 of Section 6.3 of the textbook.
- Q8. Let A be an $n \times n$ matrix with n distinct eigenvalues $\lambda_1, \ldots, \lambda_n$. Show that $\det(A) = \lambda_1\lambda_2 \ldots \lambda_n$ and $\mathrm{tr}(A) = \lambda_1 + \lambda_2 + \ldots + \lambda_n$.
- Q9. Let V be a finite-dimensional inner product space, and let W be a subspace of V. Show that $(W^\perp)^\perp = W$; i.e. the orthogonal complement of the orthogonal complement of W is again W.
- Q10*. Find a 2×2 matrix A which has $(1, 1)$ and $(1, 0)$ as eigenvectors, is not equal to the identity matrix, and is such that $A^2 = I_2$, where I_2 is the 2×2 identity matrix. (Hint: you might want to use Q7 from last week's homework to work out what the eigenvalues of A must be).