STUDY GUIDE TO THE FINAL

The final is comprehensive. This guide will describe what you need to know in addition to the study guide for the first and second midterm. This guide covers 5.1, 5.2, 5.3, 6.1, 6.2, 6.3, 6.4, 6.5 and 7.1. No calculators, closed book, no notes and no need for a blue book.

Definitions:

Knowing and understanding definitions means being able to write the mathematical statement of the definition and being able to explain the definition in your own words. Here are the words and definitions you should know and understand for the final:

- eigenvalue, eigenvectors, eigenspace;
- orthogonal complement (of a subspace);
- orthogonal and orthonormal basis;
- orthogonal projection of a vector onto a subspace (if W is the subspace and $\vec{b}$ is the vector, then we denote the projection by $\text{proj}_W \vec{b}$);
- symmetric matrix.

Notation:

Here is some useful notation that might appear in a question and which you also might be able to use to answer a question:

- diagonalisable matrix;
- Gram-Schmidt algorithm;
- least-squares solution.

Theorems:

Here are theorems whose content you should understand well. You will not be asked to write these theorems verbatim on the exam, so you don't need to memorise the exact statements, but knowing these results will help you solve some of the exam questions:

- Theorem 1, on page 269;
- Theorem 2, on page 270;
- Theorem 5, on page 282;
- Theorem 9, on page 350;
- Theorem 3, on page 397.

Miscellanea:

Understand the basics of the vector space P_n of all polynomials of degree at most n. What is the dimension of this space? What is the standard basis for this space?