Possible Topics

This is a (not exhaustive) set of possible topics for the Final Exam, roughly correlating to sections of the textbook.

The Scalar Product

1. Know how to calculate the scalar product of two vectors in $\mathbb{R}^n$.

2. Be able to compute the length of a vector in $\mathbb{R}^n$ using a scalar product.

3. Understand how the scalar product of two vectors relates to the angle between them.

4. Be able to determine the scalar and vector projections of one vector onto another.

5. Know how to define a scalar product on the vector spaces P_n and $C[a, b]$.

Orthogonal Subspaces

1. Understand how to determine if two subspaces are orthogonal to each other.

2. Be able to find the orthogonal complement of a given subspace.

3. Know how the four fundamental subspaces are related to each other.

Least Squares Problems

1. Know how to find a least squares solution to an overdetermined system of equations.

2. Be able to determine the least squares fit of a linear function to given data.

Eigenvalues and Eigenvectors

1. Know how eigenvalues and eigenvectors of a square matrix A are defined.

2. Be able to find the eigenvalues of a matrix using the characteristic equation.

3. Understand how to find the eigenspace associated with a particular eigenvalue.

4. Be able to diagonalize a matrix with distinct eigenvalues.

Review Exercises

These are a few problems from the textbook which, in addition to reviewing the homework, may help you better prepare for the exam. Also have a look at the homework for the appropriate sections.

Section 5.3: 5, 6.
Section 6.3: 1 (a, c), 2