

Final Review

The following set of topics is designed to help focus your review on the most important concepts from the course. Beyond this, the review sheets for Exams 2 and 3, Writing Assignments 6-9, and Problem Sets 14-23, are excellent sources of practice and review.

1 Definitions

You should know the following precisely:

- 4.1.12 • 4.2.3 • 4.2.9 • 4.4.3 • 5.3.7 • 5.4.9
- 4.1.14 • 4.2.6 • 4.2.12 • 5.1.1 • 5.4.1
- 4.1.15 • 4.2.7 • 4.3.1 • 5.1.7 • 5.4.3
- 4.2.2 • 4.2.8 • 4.4.1 • 5.2.1 • 5.4.6

You do not need to memorize Definition 4.1.1, but you should be familiar with which properties of vector spaces are part of the definition, and which are propositions that can be proved from this definition.

2 Theorems

You will be asked to prove at least one of these results:

- 3.5.4 • 4.2.14 • 4.4.15 • 5.2.2 • 5.2.13
- 3.5.13 • 4.3.2 • 5.1.3 • 5.2.5 • 5.2.14
- 4.1.8 • 4.4.2 • 5.1.4 • 5.2.6 • 5.4.2
- 4.1.16 • 4.4.12 • 5.1.16 • 5.2.9 • 5.4.4

3 Concepts

- For any of the definitions listed above give a specific, illustrative, example.
- Given a set, a field, and two operations. Determine whether they form a vector space.
- Describe the relationship between null space of a matrix and the solutions to a matrix-vector equation.
- Describe the relationship between the dimensions of the domain and range of a linear transformation to its rank and nullity.

4 Computations

- Given a system of equations, determine whether it is consistent and describe the solution set.
- Given a basis, compute the coordinates of a vector in that basis.
- Given a bases for the domain and range of a linear transformation, compute the matrix relative to those coordinates.
- Compute the product of a matrix and a vector.
- Given two matrices compute a specific entry in their product.
- Compute the determinant of a matrix. (Maximum: 4×4)
- Compute the characteristic polynomial of a matrix. (Maximum: 4×4)