Possible Topics

This is a (not exhaustive) set of possible topics for Exam 1, roughly correlating to sections of the textbook.

Systems of Linear Equations

1. Understand how to write a system as an augmented matrix and vice versa.

2. Be able to graphically interpret the solution set of an $m \times 2$ system.

3. Know the three elementary row operations and how to use them.

4. Understand the idea of an equivalent system of equations.

5. Be able to perform the back substitution algorithm.

Solving Linear Systems

1. Know the properties of row echelon and reduced row echelon form.

2. Be able to find the solution set of a system with either of these forms.

3. Understand the difference between lead and free variables and how to identify them.

4. Know how to perform the Gauss-Jordan elimination and reduction algorithms.

Matrix Arithmetic

1. Understand the notation of vectors and matrices.

2. Know how to determine if two matrices are equal.

3. Be able to perform scalar, matrix-vector, and matrix-matrix multiplication.

4. Know how to perform matrix and vector addition.

5. Be able to write a linear system in the form $A\mathbf{x} = \mathbf{b}$.

6. Understand the definition of a linear combination of vectors.

7. Be able to describe matrix-vector and matrix-matrix multiplications in terms of either scalar products or linear combinations.

8. Know how to determine the transpose of a matrix.

Matrix Algebra

1. Know the algebraic rules for matrices and transposes as listed in the textbook and be able to apply them.

2. Be able to construct an identity matrix and understand its importance.

3. Understand how to determine if two matrices are inverses and the situations when a matrix may not be invertible.

4. Be able to find the inverse of a nonsingular matrix.

Elementary Matrices

1. Be able to construct elementary matrices from each of the three elementary row operations.

2. Know how to quickly find the inverse of an elementary matrix.

3. Understand the three equivalent conditions for nonsingularity as listed in the textbook.

4. Be able to identify triangular and diagonal matrices.

5. Know how to perform the triangular (or LU) factorization of a matrix.

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. The problem numbers are from the 8th edition of the textbook, which I will cross-reference to the other editions over the weekend.

Section 1.2: 6(d). Section 1.3: 1(h). Section 1.5: 8(d).