Study guide

- (§1.5) Terminology: *homogeneous* linear system, *trivial solution.*
- (§1.5) Once you know that $A\vec{x} = \vec{b}$ has one solution, you can find all of the other solutions by solving the homogeneous equation $A\vec{x} = \vec{0}$. Understand why this is.
- (§1.6) Determinants, interpreted as area/volume expansion factor.
- (§1.6) Techniques to evaluate determinants: formulas for 2×2 and 3×3 cases; row-reduction; cofactor expansion.
- (§2.1 and 2.2) Know the definition of "linear combination," and visual interpretation.
- (§2.2) How can you tell whether a particular vector is a linear combination of some other vectors? How can you desribe the set of all vectors that can be written as a linear combination of a specific set of vectors?
- (§2.2) Understand how to interpret a matrix equation $A\vec{x} = \vec{b}$ in terms of linear combinations of the columns of A.

Textbook problems

- §1.5: 26, 28
- §1.6: 10, 22, 26, 52 (hint for 52: use the result of supplementary problem 2. You may also use the fact tthat $\det A = \det A^t$.)
- §2.1: 18, 30
- §2.2: 2, 12, 32, 33, 38

Supplemental problems:

1. Suppose that A is a square matrix.
   (a) Prove that if A has a column consisting entirely of 0s, then $\det A = 0$.
   (b) Prove that if two rows of A are identical, then $\det A = 0$.
2. Suppose that A is an $n \times n$ matrix and c is a consant. Prove that

$$\det(c \cdot A) = c^n \det A.$$