Math H54 | Honors Linear Algebra and Differential Equations | Spring, 2004

Prof. Haiman

Homework 5

due Friday, March 5

Reading for Lectures 10–12:

- Sections 3.1–3.7, skipping the parts of 3.2 on "Dot product, Norm and Length" and "Projections" (we'll cover this later).

Problems:

- Section 3.3 Ex. 18, 22, 24, 26, 28, 30
- Section 3.4 Ex. 2, 4, 6, 17, 20
- Section 3.4 Ex. 48. "Describe" means give the simplest possible description.
- Problem A. Find a set of vectors that span the nullspace NS(A), where

$$A = \begin{bmatrix} 1 & 6 & 4 & -11 & 2 \\ 2 & 2 & -2 & 9 & 3 \\ -1 & 2 & 4 & -10 & -5 \end{bmatrix}$$

- Problem B. Let $\mathcal{B} = \{\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_k\}$ be a spanning subset of a vector space V. Suppose no proper subset of $\mathcal{B}$ spans V. Prove that $\mathcal{B}$ is linearly independent (and therefore a basis of V). Hint: it's easiest to prove the contrapositive, that if $\mathcal{B}$ is dependent, then it has a proper subset that spans V.