

HW 2 – 4803, Fall 2019

Instructor: Wenjing Liao

- HW 2 is due on Wednesday September 18 at the beginning of the class.
- You are strongly encouraged to type out your solutions using latex.
- Please write your solutions independently, and include your code at the end of your solutions.

Part I (Review of linear algebra)

- 1:** Let A be an $n \times n$ matrix, and let \vec{b} and \vec{c} be two vectors in \mathbb{R}^n . We are told that the system $A\vec{x} = \vec{b}$ has a unique solution. What can you say about the number of solutions of the system $A\vec{x} = \vec{c}$?
- 2:** Let A be an $n \times n$ matrix, and let \vec{b} and \vec{c} be two vectors in \mathbb{R}^n . We are told that the system $A\vec{x} = \vec{b}$ has no solution. What can you say about the number of solutions of the system $A\vec{x} = \vec{c}$?

Part II (Logistic regression)

4.7 Exercises: 1,4,6,8,9

Part III (Programming)

Programming Problem 1: Exercise 4.7 – 11 (a,b,c,f,g). If you use Matlab or Python, the functions will be different from the ones in R.

Programming Problem 2: This question involves the Boston data set in <http://lib.stat.cmu.edu/datasets/boston>.

- (1) Read the data as a matrix with 14 columns.
- (2) Fit classification models in order to predict whether a given suburb has a crime rate above or below the median. Explore logistic regression and KNN models. Describe your findings.