

Pre-lab 2

Stats 413: Applied Regression Analysis

due Sep 17, 2020 before the first lab session

Pre-labs are due on Canvas on the due date. For problems that require programming, please properly comment your code and submit it together with any output. You are encouraged to collaborate on pre-labs with classmates, but the final write-up (including any code) **must be your own**.

1. **Install and load the package ‘ISLR’.** Your first task is to install and load the package ‘ISLR’ (includes data for *Introduction to Statistical Learning*) on your personal computer. Some packages, like ‘MASS’ are pre-installed in R, but some must be downloaded the first time you use them. Every time you restart R, you will need to load it using the `library` function.
2. **Writing functions.** For this task, define a function which takes the standard inner product (dot product) of two vectors, x and y in \mathbb{R}^n . Show your function works by providing its output on at least two test cases.

Hint: See section 3.6.7 in ISL for a primer on writing functions in R.

3. **The `lm` function.** Create a script that performs the following tasks:
 - Create a vector x containing the ordered integers from 1 to 10.
 - Create another vector $y = x + \epsilon$, where the statistical error vector ϵ follows a 10-dimensional multivariate normal distribution $N_{10}(\mathbf{0}, I_{10})$ (I_{10} is the 10×10 identity matrix).
 - Do the linear regression of y on x with the `lm` function.

As a reminder, you must properly comment your code so that the purpose of each block of code is clear. This applies to all programming assignments in this course.