ENGRD 2700: Basic Engineering Probability and Statistics
Fall 2019
Homework 9

Due **Friday December 13th** at 11:59 pm. Submit to Gradescope by clicking the name of the assignment. See `https://people.orie.cornell.edu/yudong.chen/engrd2700_2019fa.html#homework` for detailed submission instructions.

The same stipulations from Homework 1 (e.g., independent work, computer code, etc.) still apply.

1. We want to fit a regression line to the data pairs $(1, 4)$, $(2, 3)$, $(3, 5)$, $(4, 10)$.

   (a) Find the line $y = \beta_0 + \beta_1 x$ that minimizes the sum of squared errors.

   (b) Compute the R^2–value associated with the line you found in part (a).

   (c) Construct a 95% confidence interval for the slope coefficient β_1.

   (d) If we perform the hypothesis test

   $$H_0 : \beta_1 = 0 \qquad\qquad H_1 : \beta_1 \neq 0,$$

   at the $\alpha = 0.05$ significance level, do we reject H_0? Why or why not?

2. Consider once again the dataset `Quartet.csv` from Homework 1. Import this file into R or RStudio, or similar software.

   (a) Apply linear regression to each of the four datasets in the file. Attach your code, and report the four lines you obtain. (If you use R, you can use the command `reg = lm(y ~ x)` to fit a line between the predictor x and the response y, and the command `summary(reg)` to read the results.)

   (b) What are the R^2–values associated with the four models from part (a)? Attach your code for computing the R^2 values. (If you use R, you can find the R^2 value by reading the "Multiple R-Squared" from the output of the command `summary(reg)`.)