ENGR 0020 PROB & STAT FOR ENGINEERS I
Recitation 10

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Office Hour: Thursday 2:00 – 3:00pm, 1023 Benedum Hall

Goals:

1. To help to understand the lecture and homework questions.

2. To take quizzes for getting the feedback of the class. The quizzes will take 10 mins at the end of recitation.

1. **(Linear Regression Line; Exercise 11.6, p399)** In a certain type of metal test specimen, the normal stress on a specimen is known to be functionally related to the shear resistance. The following is a set of coded experimental data on the two variables:

Normal Stress, x	Shear Resistance, y
26.8	26.6
25.4	27.3
28.9	24.2
23.6	27.1
27.7	23.6
23.9	25.9
24.7	26.3
28.1	22.5
26.9	21.7
27.4	21.4
22.6	25.8
25.6	24.9

(a) Estimate the regression line $\mu_{Y|x} = \beta_0 + \beta_1 x$.

(b) Estimate the shear resistance for a normal stress of 24.5.

2. **(Confidence interval for parameters; Exercise 11.18, p412)** With reference to the first exercise,

(a) evaluate s^2;

(b) construct a 99% confidence interval for β_0;

(c) construct a 99% confidence interval for β_1;

3. **(Confidence interval v.s. Prediction interval; Exercise 11.23, p412)** With reference to the last two exercises to compute

   (a) a 95% confidence interval for the mean shear resistance when $x = 24.5$.

   (b) a 95% prediction interval for a single predicted value of the shear resistance when $x = 24.5$.

4. **(Data Transformation)** Assume we have a set of data:

Independent variable, x	Dependent variable, y
1	11.25
2	63.47
3	252.15
4	4535.22
5	51670.95

Build a proper regression model to express the relationship between x and y.