

## Homework I (Group of Five or less): Linear Regression

1. The tensile strength of a paper product is related to the amount of hardwood in the pulp. Ten samples are produced in the pilot plant, and the data obtained are shown in the following table.

Strength	Percent Hardwood	Strength	Percent Hardwood
160	10	181	20
171	15	188	25
175	15	193	25
182	20	195	28
184	20	200	30

- (a) Fit a linear regression model relating strength to percent hardwood.
- (b) Test the model in part (a) for significance of regression.
- (c) Find a 95 percent confidence interval on the parameter  $\beta_1$ .

2. A sample of 25 brands of cigarette has been tested for tar and nicotine contents, carbonmonoxide (mgs) emitted by cigarette smoke, and cigarette weight (g). Past studies have shown that the amount CO emitted increases with the tar and nicotine content.
- a) Model the CO emitted by cigratte as a linear function of the other three quantities. Determine SSR, SSE,  $R^2$ , adjusted  $R^2$ , and show the fitted model coefficients.
  - b) Which variables are significant and not significant in the model ?
  - c) Remove the most significant variable in a) and refit the model. How do the model coefficients and your conclusion about the significance of variables change compared to a) ?

Load data from 'CO-smoke' sheet in lect02-lin-reg.xlsx