

## STA 506 2.0 Linear Regression Analysis

The systolic blood pressure is thought to be related to the weight of an individual. The weight and systolic blood pressure of 15 randomly selected males in the age group 30 - 40 are shown below.

```
weight <- c(185, 187, 180, 155, 212, 175, 190, 210, 200, 190,
            168, 189, 190, 172, 189, 168, 174, 183, 155, 195,
            180, 143, 240, 235, 192, 197)
SBP <- c(148, 151, 146, 139, 159, 144, 150, 155, 152, 149, 141,
         150, 150, 143, 150, 143, 145, 147, 136, 154, 146,
         133, 169, 165, 150, 153)
data <- data.frame(weight, SBP)
data
```

	weight	SBP
1	185	148
2	187	151
3	180	146
4	155	139
5	212	159
6	175	144
7	190	150
8	210	155
9	200	152
10	190	149
11	168	141
12	189	150
13	190	150
14	172	143
15	189	150
16	168	143
17	174	145
18	183	147
19	155	136
20	195	154
21	180	146
22	143	133
23	240	169
24	235	165
25	192	150
26	197	153

1. Make a scatterplot of the data.
2. Estimate the correlation coefficient.
3. Fit a simple linear regression model with intercept to the data.

4. Test the hypothesis  $H_0 : \beta_1 = 0$  vs  $H_0 : \beta_1 \neq 0$
5. Construct the analysis-of-variance table and test for significance of regression.
6. Find a 95% confidence interval on the slope and the intercept and interpret the confidence intervals.
7. Fit a no-intercept model to the data and compare it to the model obtained above. Which model you conclude is superior?