

R for Chapter 4

Running List of Functions Applied to the Data Set, class.data:

```
> attach(class.data)

> reg <- lm(wt ~ ht)

>summary(reg)

## Suppose we want to find three confidence intervals for the average wt at heights
## ht = 60, 65 and 70 inches, respectively. Moreover, we want these intervals to simultaneously
## contain their means with a probability of at least .88.

> predict(reg,newdata=data.frame(ht=c(60,65,70)),se.fit=TRUE, interval="confidence", pred.var=TRUE,level=.96)

## Suppose now we want to predict the weight of three individuals at heights
## ht = 60, 65 and 70 inches, respectively. Moreover, we want these three prediction intervals
## to simultaneously contain their weights with a probability of at least .88.

> predict(reg,newdata=data.frame(ht=c(60,65,70)),se.fit=TRUE, interval="predict", pred.var=TRUE,level=.96)

## We now seek to graph 95% confidence intervals and prediction intervals
## over the range of possible X values, forming bands around the fitted line.
## This is NOT a band that covers all possible X values simultaneously with probability .95

>pred.frame <- data.frame(ht=c(62:73) ## creates a data frame consisting of ht values including all integers
## from 62 through 73)

>> pc <- predict(reg,interval="confidence", newdata=pred.frame) ## finds the confidence bounds for the average wt at
## each ht in the pred.frame

> pp <- predict(reg,interval="predict", newdata=pred.frame) ## finds the prediction bounds for an individual wt at
## each ht in the pred.frame

> plot(ht,wt,ylim=range(wt,pp)) ## scatter plot of ht versus wt, making room vertically for all the values in both
## variables wt and pp

> pred.ht <- pred.frame$ht ## extracts the variable values for ht from the pred.frame

> matlines(pred.ht,pc,lty=c(1,2,2),col="black") ## draws the fitted line as a solid line and the confidence bands as a
## hashed line

> matlines(pred.ht,pp,lty=c(1,3,3),col="black") ## draws the fitted line as a solid line and the prediction bands as a
## hashed line
```