R Code for Chapter 4

cleaning <- read.delim("C:/Teaching@cofc/Math 550/Chapter 3/cleaning.txt")

attach(cleaning)

plot(Crews,Rooms)

crews <- data.frame(Crews= c(4, 16))

ls <- lm(Rooms~Crews, data=cleaning)

plot(ls)

predict <- predict(ls, newdata = crews ,interval = "prediction", level = 0.95)

sd<-aggregate(Rooms, by=list(Crews =Crews), FUN=sd)

Newdata<-merge(cleaning,sd)

attach(Newdata)

wls <- lm(Rooms~Crews, data=Newdata, weights=1/x^2)

vcov(wls)

sw<-sum(1/x^2)

mean\_crews<-sum(1/x^2\*Crews)/sw

mean\_rooms<-sum(1/x^2\*Rooms)/sw

WSxx<-sum(1/x^2\*(Crews-mean\_crews)^2)

S\_sq<-sum(1/x^2\*resid(wls)^2)/(nrow(Newdata)-2)

WSxy<-sum(1/x^2\*(Rooms-mean\_rooms)\*(Crews-mean\_crews))

summary(wls)

slope<- WSxy/ WSxx

sd\_betahat\_1<-sqrt(S\_sq)\*sqrt(1/ WSxx)

intercept<-mean\_rooms-slope\* mean\_crews

sd\_betahat\_0<-sqrt(S\_sq)\*sqrt(1/sw+mean\_crews ^2/ WSxx)

ncrews <- data.frame(Crews= c(4, 16))

predictw <- predict(wls, newdata = ncrews ,interval = "prediction", level = 0.95)

attach(Newdata)

ynew<-1/x\*Rooms

x1<-1/x

x2<-1/x\*Crews

OLS<-lm(ynew~x1+x2-1)

plot(OLS)

oncrews <-c(1/ 4.966555\*4, 1/ 12.000463\*16)

ow<-c(1/ 4.966555, 1/ 12.000463)

predicto <- predict(OLS,list(x1=ow, x2=oncrews),interval = "prediction", level = 0.95)

tranpredict<- predicto/ow

tranpredict

Emphasize the effectiveness of sqrt(|standardized residuals|) vs fitted values to identify nonconstant variance

**compare result from predict and tranpredict**

**fit lwr upr**

**1 16.58827 1.58941 31.58713**

**2 60.99899 45.81025 76.18773**

**fit lwr upr**

**1 16.11133 6.387816 25.83484**

**2 62.01687 38.395259 85.63849**