9.10

**For case 1 (ehati=1 hii = 0.9000): ri = .7905694, ti = .7874992, Di = 1.125**

Since this case has the largest value of Di, it has the largest influence on the fitted values and Beta and therefore has the **largest influence** on the analysis.

From our two tailed t-table with df = 48 and significance level .05, we get a comparative t value of +-2.0106. Since our calculated ti is less than our comparative t value, we can say that this event is **not an outlier**.

R Code:

*n = 54*

*pprime = 5*

*varhat = 4*

*ehat = 1*

*hii = .9*

*ri = ehat/(varhat\*sqrt(1-hii))*

*ri*

*ti = ri\*sqrt(((n-pprime-1)/(n-pprime-ri^2)))*

*ti*

*di = (1/pprime) \* ri^2 \* (hii/(1-hii))*

*di*

*Graphical user interface, text, application

Description automatically generated*

**For case 2: ri = .866, ti = .8637532, Di = .4499736**

Since this case has the second largest value for Di it has the second largest influence on the fitted values and Beta and therefore has the **second largest influence** on the analysis.

From our two tailed t-table with df = 48 and significance level .05, we get a comparative t value of +-2.0106. Since our calculated ti is less than our comparative t value, we can say that this event is **not an outlier**.

R Code:

*ehat = 1.732*

*hii = .75*

*ri = ehat/(varhat\*sqrt(1-hii))*

*ri*

*ti = ri\*sqrt(((n-pprime-1)/(n-pprime-ri^2)))*

*ti*

*di = (1/pprime) \* ri^2 \* (hii/(1-hii))*

*di*

Graphical user interface, text, application

Description automatically generated

**For case 3: ri = 2.598076, ti = 2.769231, Di = .45**

Since this case has the third largest value for Di it has the third largest influence on the fitted values and Beta and therefore has the **third largest influence** on the analysis.

From our two tailed t-table with df = 48 and significance level .05, we get a comparative t value of +-2.0106. Since our calculated ti is less than our comparative t value, we can say that this event **is an outlier**.

R Code:

*ehat = 9*

*hii = .25*

*ri = ehat/(varhat\*sqrt(1-hii))*

*ri*

*ti = ri\*sqrt(((n-pprime-1)/(n-pprime-ri^2)))*

*ti*

*di = (1/pprime) \* ri^2 \* (hii/(1-hii))*

*di*

Graphical user interface, text, application

Description automatically generated

For case 4: ri = 2.850937, ti = 3.089544, Di = .3689939

Since this case has the fourth largest value for Di it has the fourth largest influence on the fitted values and Beta and therefore has the **fourth largest influence** on the analysis.

From our two tailed t-table with df = 48 and significance level .05, we get a comparative t value of +-2.0106. Since our calculated ti is less than our comparative t value, we can say that this event **is an outlier**.

R Code:

*ehat = 10.295*

*hii = .185*

*ri = ehat/(varhat\*sqrt(1-hii))*

*ri*

*ti = ri\*sqrt(((n-pprime-1)/(n-pprime-ri^2)))*

*ti*

*di = (1/pprime) \* ri^2 \* (hii/(1-hii))*

*di*

*Graphical user interface, text, application

Description automatically generated*

10.3

Forward Selection

*attach(mantel)*

*mantel*

*min.model = lm(Y~1, data=mantel)*

*full <- formula(lm(Y~X1+X2+X3,mantel))*

*fwd.model = step(min.model, direction='forward', scope=full)*

*fwd.model$coefficients*

*fwd.model$anova*

*mantel*

*A picture containing text, receipt

Description automatically generated*

Backward Selection

*max.model = lm(Y~X1+X2+X3, data=mantel)*

*min <- formula(lm(Y~1,mantel))*

*bckwd.model = step(max.model, direction='backward', scope=full)*

*bckwd.model$coefficients*

*bckwd.model$anova*

*mantel*

*A picture containing text, receipt

Description automatically generated*

AIC and BIC calculations

M1 has all the variables, M2 has X1 and X2, M3 has X1, and M4 has just the intercept.

X2 appears to be the most active regressor since there is such a large reduction in BIC and AIC from M3 to M2. It appears that X1 is not very active since the change in BIC and AIC from M3 to M4 is very small and insignificant. It also appears that X3 is not very active since the change in BIC and AIC from M1 to M2 is very small and insignificant

*m1 = lm(Y~X1 + X2 + X3, data=mantel)*

*m2 = lm(Y~X1 + X2, data=mantel)*

*m3 = lm(Y~X1, data=mantel)*

*m4 = lm(Y~1, data=mantel)*

*AIC(m1)*

*BIC(m1)*

*AIC(m2)*

*BIC(m2)*

*AIC(m3)*

*BIC(m3)*

*AIC(m4)*

*BIC(m4)*

Text

Description automatically generated with medium confidence