Tugas Pertemuan Minggu 4-5: Asumsi Regresi Linier Sederhana

Analisis Uji Ketidakpasan dan Uji Asumsi Regresi Linier Sederhana mengenai hubungan antara usia Height dan HandSpan pada data handheight

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# Membaca Data

handheight<-read.table("C:/Users/LENOVO/OneDrive/Documents/Learning R/Semester 2/handheight.txt", header = TRUE)  
head(handheight)

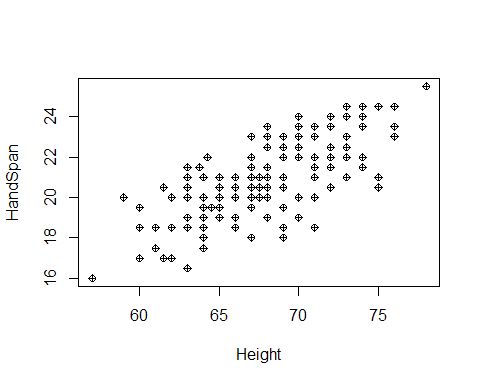
## Sex Height HandSpan  
## 1 Female 68 21.5  
## 2 Male 71 23.5  
## 3 Male 73 22.5  
## 4 Female 64 18.0  
## 5 Male 68 23.5  
## 6 Female 59 20.0

# Eksplorasi data

summary(handheight)

## Sex Height HandSpan   
## Length:167 Min. :57.00 Min. :16.00   
## Class :character 1st Qu.:65.00 1st Qu.:19.50   
## Mode :character Median :68.00 Median :21.00   
## Mean :68.07 Mean :20.86   
## 3rd Qu.:71.00 3rd Qu.:22.00   
## Max. :78.00 Max. :25.50

plot(handheight$Height, handheight$HandSpan, xlab="Height", ylab="HandSpan", pch=10)



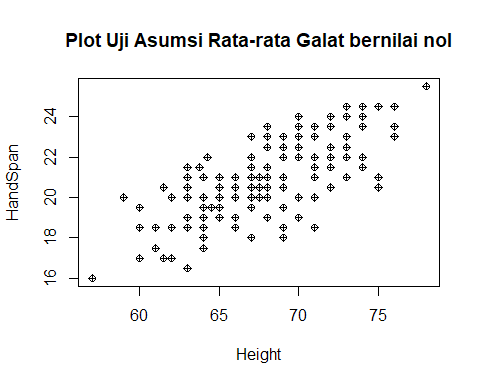
# Persamaan Regresi

model2 <- lm(HandSpan ~ Height, data = handheight)  
summary(model2)

##   
## Call:  
## lm(formula = HandSpan ~ Height, data = handheight)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -3.3888 -0.9348 0.0135 1.0365 2.6629   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -3.00161 1.69394 -1.772 0.0782 .   
## Height 0.35057 0.02484 14.113 <2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 1.301 on 165 degrees of freedom  
## Multiple R-squared: 0.5469, Adjusted R-squared: 0.5442   
## F-statistic: 199.2 on 1 and 165 DF, p-value: < 2.2e-16

# Asumsi 1: Rata-rata galat diasumsikan bernilai nol

plot(handheight$Height, handheight$HandSpan,   
 xlab="Height", ylab="HandSpan", pch=10,   
 main="Plot Uji Asumsi Rata-rata Galat bernilai nol")

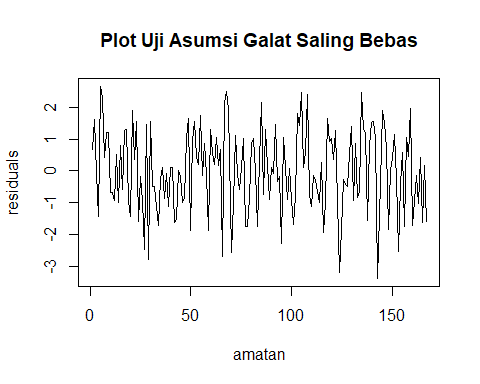


# Asumsi 2: Galat saling bebas

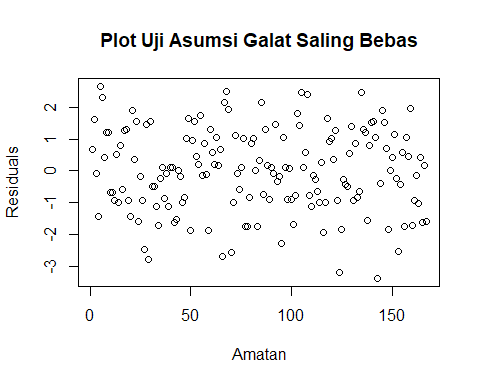
c <- (1:167)  
handheight <- cbind(handheight, c)  
head(handheight)

## Sex Height HandSpan c  
## 1 Female 68 21.5 1  
## 2 Male 71 23.5 2  
## 3 Male 73 22.5 3  
## 4 Female 64 18.0 4  
## 5 Male 68 23.5 5  
## 6 Female 59 20.0 6

plot(handheight$c, model2$residuals,  
 xlab = "amatan", ylab = "residuals", type = "l",  
 main = "Plot Uji Asumsi Galat Saling Bebas")



plot(handheight$c,model2$residuals,  
 xlab="Amatan",ylab="Residuals",  
 main="Plot Uji Asumsi Galat Saling Bebas")



# Asumsi 3: Galat berdistribusi normal

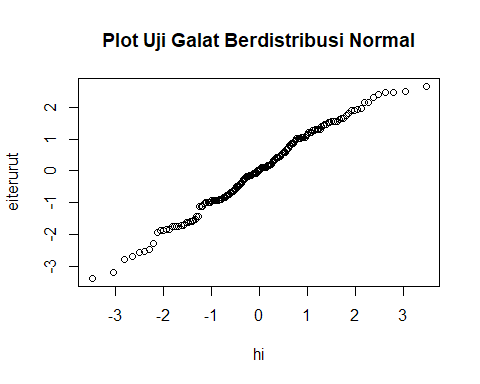
c <- (1:167)  
ytopi <- model2$fitted.values  
ei <- model2$residuals  
eiterurut <- sort(model2$residuals)  
anova(model2)

## Analysis of Variance Table  
##   
## Response: HandSpan  
## Df Sum Sq Mean Sq F value Pr(>F)   
## Height 1 337.08 337.08 199.17 < 2.2e-16 \*\*\*  
## Residuals 165 279.25 1.69   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

hi<-sqrt(1.69)\*qnorm((c-0.375)/(167+0.25))  
Hi<-cbind(handheight, ytopi, ei, eiterurut, hi)  
head(Hi)

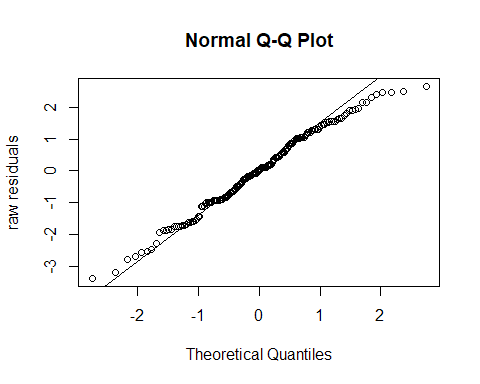
## Sex Height HandSpan c ytopi ei eiterurut hi  
## 1 Female 68 21.5 1 20.83708 0.66291514 -3.388792 -3.477447  
## 2 Male 71 23.5 2 21.88879 1.61120802 -3.187654 -3.038280  
## 3 Male 73 22.5 3 22.58993 -0.08993006 -2.791068 -2.797719  
## 4 Female 64 18.0 4 19.43481 -1.43480870 -2.687654 -2.626440  
## 5 Male 68 23.5 5 20.83708 2.66291514 -2.584240 -2.491399  
## 6 Female 59 20.0 6 17.68196 2.31803650 -2.538223 -2.378873

plot(hi,eiterurut,  
 xlab="hi",ylab="eiterurut",  
 main="Plot Uji Galat Berdistribusi Normal")



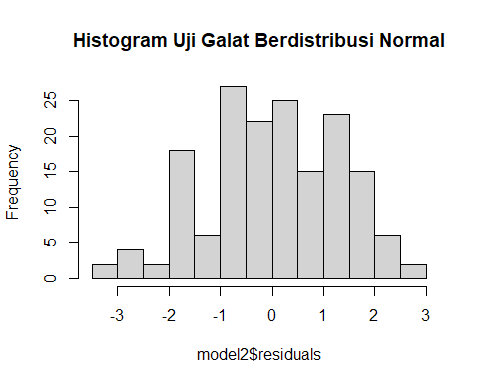
### Atau gunakan fungsi qqnorm dan qqline di R berikut

qqnorm(model2$residuals, ylab = "raw residuals")  
qqline(model2$residuals)



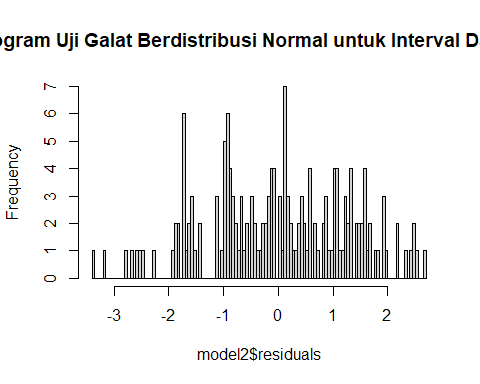
## Histogram

hist(model2$residuals, main="Histogram Uji Galat Berdistribusi Normal")



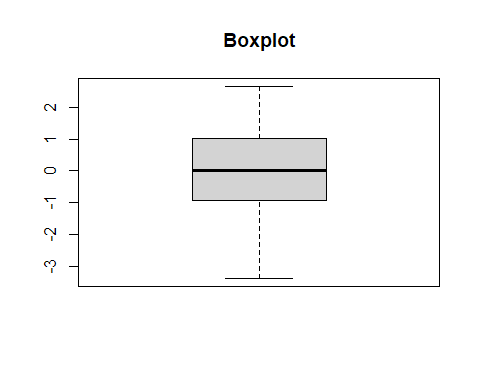
## Histogram untuk interval data = 167

hist(model2$residuals, 167, main="Histogram Uji Galat Berdistribusi Normal untuk Interval Data = 167")



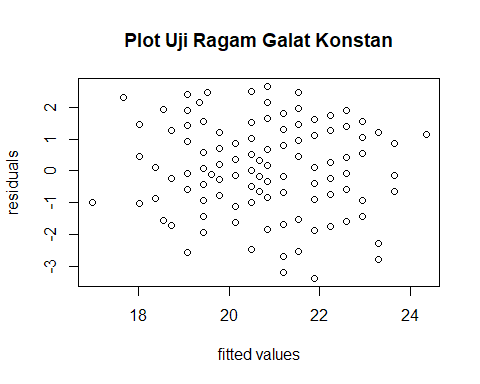
## Boxplot

boxplot(model2$residuals, main="Boxplot")



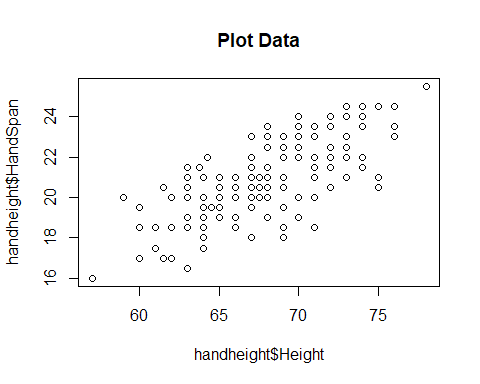
# Asumsi 4: Ragam galat diasumsikan konstan

ytopi<-model2$fitted.values  
ei<-model2$residuals  
plot(ytopi,ei,  
 xlab="fitted values", ylab="residuals",  
 main="Plot Uji Ragam Galat Konstan")



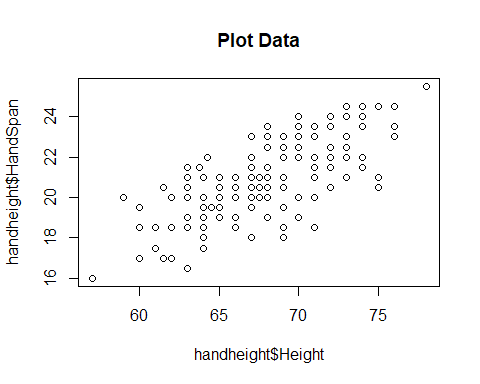
# Asumsi 5: X dan Y berhubungan linear

plot(handheight$Height, handheight$HandSpan, main="Plot Data")



# Asumsi 6: Tidak ada outlier

plot(handheight$Height, handheight$HandSpan, main="Plot Data")



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