

HW3_kexinx

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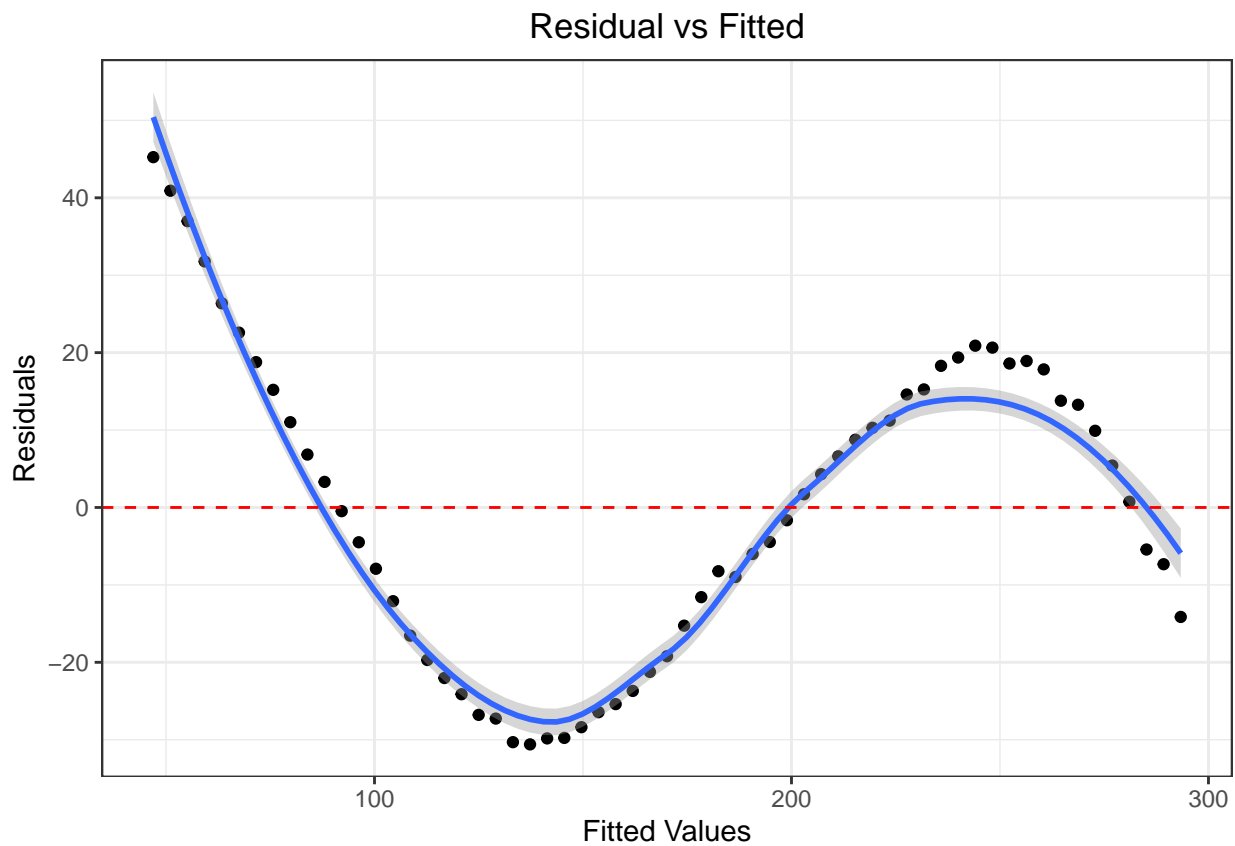
Sep 23th 2021

Problem 2

Problem 3

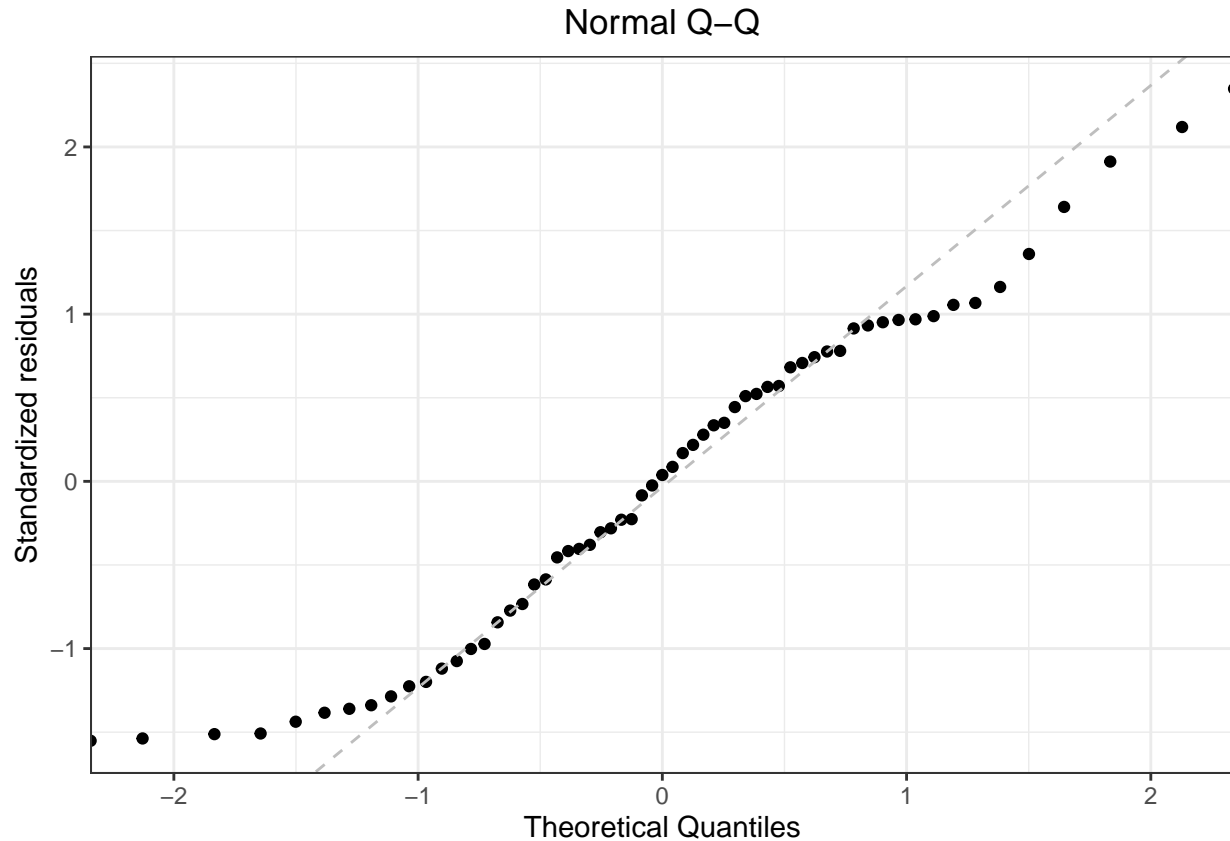
We use ggplot2 function to create diagnostics plot.

```
#Residual vs Fitted Plot  
prf<-ggplot(data=fit.diags, aes(x=.fitted,y=.resid))+geom_point()  
prf<-prf+geom_smooth()+geom_hline(yintercept = 0,col='red',linetype='dashed')  
prf<-prf+xlabs('Fitted Values')+ylab('Residuals')  
prf<-prf+labs(title="Residual vs Fitted")+theme_bw()+theme(plot.title = element_text(hjust = 0.5))  
prf
```

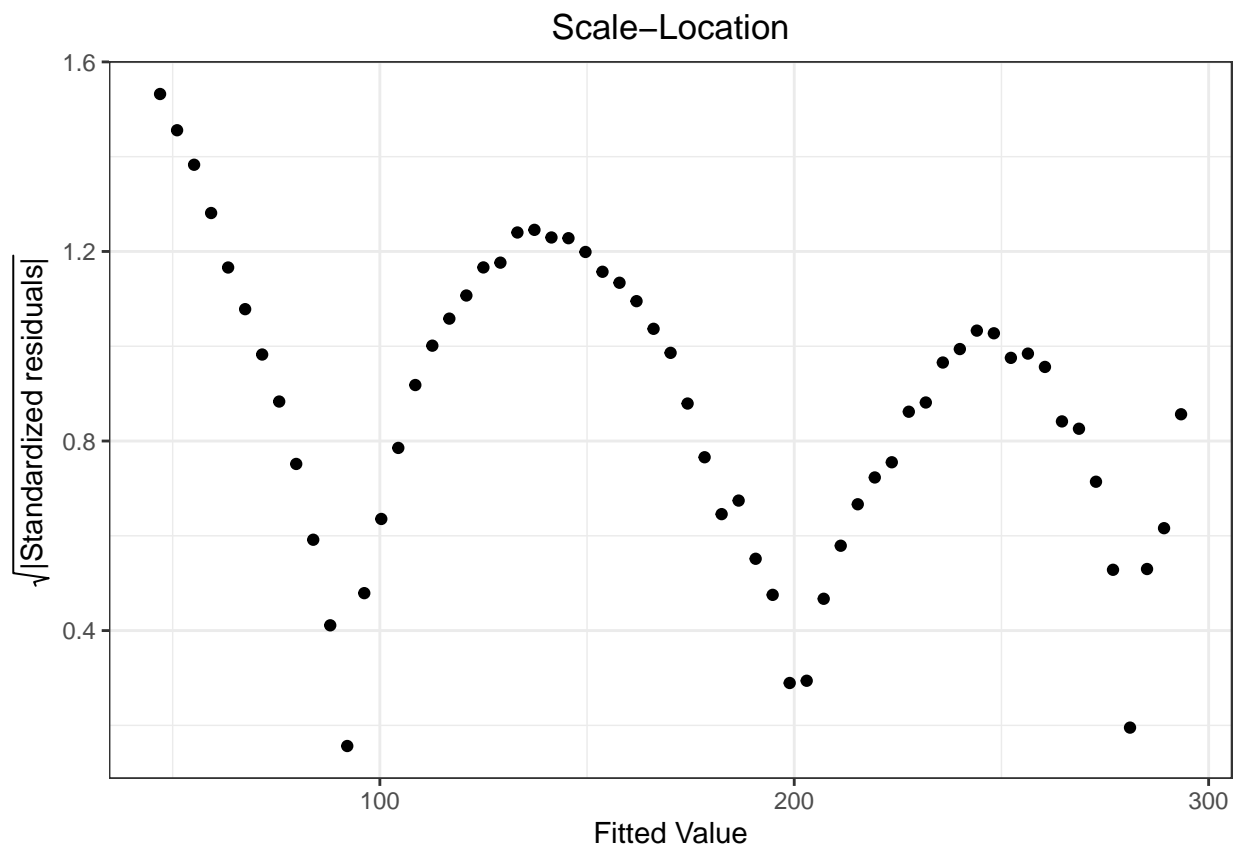


```
#Normal Q-Q  
probs<-seq(0,1,length.out = length(fit.diags$.std.resid))  
quantiles<-qnorm(probs,0,1)[order(order(fit.diags$.std.resid))]
```

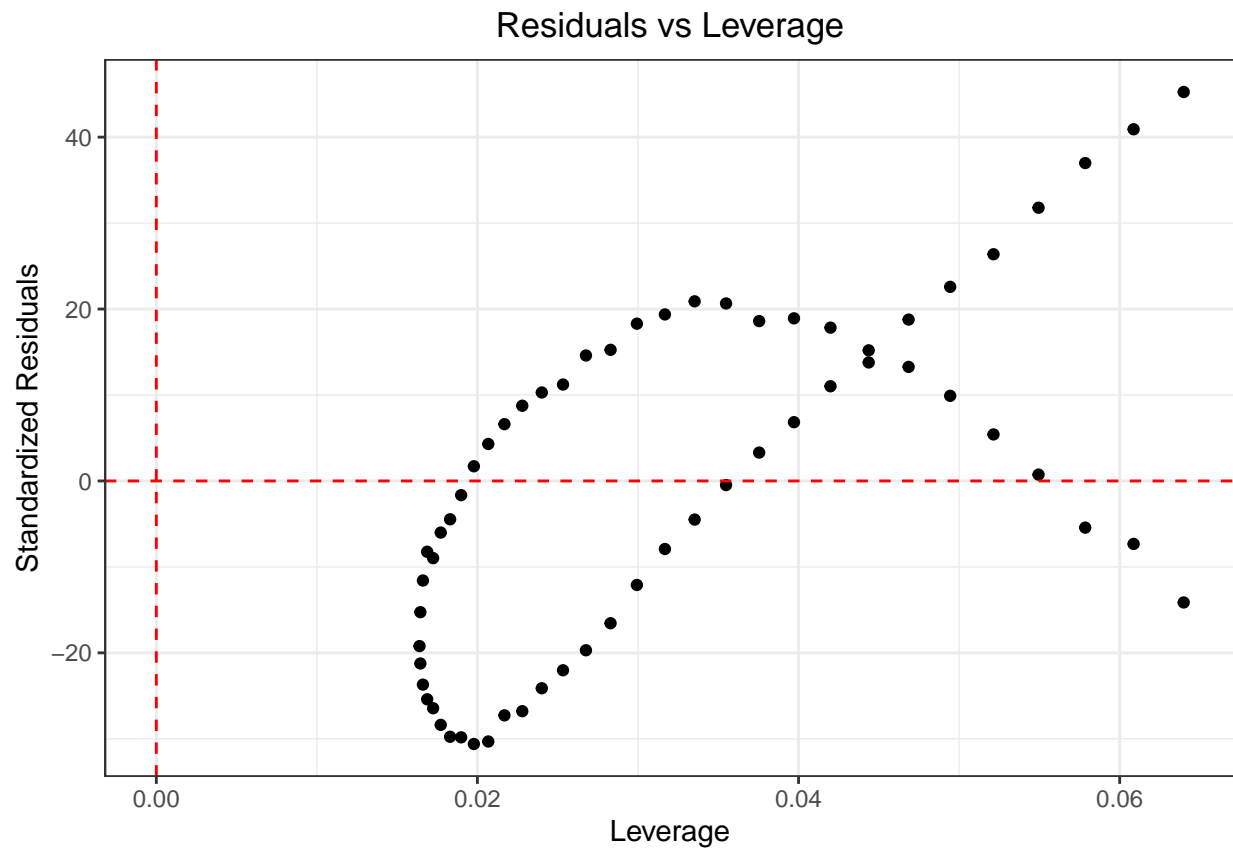
```
pn<-ggplot(data=fit.diags, aes(x=quantiles,y=.std.resid))+geom_point()
y<-quantile(fit.diags$.std.resid, c(0.25,0.75),names=FALSE, na.rm = TRUE)
x<-qnorm(c(0.25,0.75))
pn<-pn+geom_abline(intercept=y[1L] - (diff(y)/diff(x))*x[1L],slope=diff(y)/diff(x),col="gray",lty=2)
pn<-pn+xlab('Theoretical Quantiles')+ylab('Standardized residuals')
pn<-pn+labs(title="Normal Q-Q")+theme_bw()+theme(plot.title = element_text(hjust = 0.5))
pn
```



```
#Scale-Location
psl<-ggplot(data=fit.diags,aes(x=.fitted,y=sqrt(abs(.std.resid))))+geom_point()
psl<-psl+xlab('Fitted Value')+ylab(expression(sqrt("|Standardized residuals|")))
psl<-psl+labs(title="Scale-Location")+theme_bw()+theme(plot.title = element_text(hjust = 0.5))
psl
```



```
#Residuals vs Leverage
prl<-ggplot(data=fit.diags, aes(x=.hat,y=.resid))+geom_point()
prl<-prl+geom_hline(yintercept = 0,col='red',linetype='dashed')
prl<-prl+geom_vline(xintercept = 0,col='red',linetype='dashed')
prl<-prl+xlabs('Leverage')+ylabs('Standardized Residuals')
prl<-prl+labs(title="Residuals vs Leverage")+theme_bw()+theme(plot.title = element_text(hjust = 0.5))
prl
```



Problem 4

In problem 4, we create a single multipanel plot of four diagnostic plots using `ggarrange`.

```
diag<-ggarrange(prf,pn,psl,prl,  
               ncol=2,nrow=2)  
annotate_figure(diag,top=text_grob('Diagnostic Plots',color='Black',face='bold',size=14))
```

Diagnostic Plots

