IE484-Case4-Problem1

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RegressionPlots <- function(fit){  
   
 # Extract fitted values from lm() object  
 Fitted.Values <- fitted(fit)  
   
 # Extract residuals from lm() object  
 Residuals <- resid(fit)  
   
 # Extract standardized residuals from lm() object  
 Standardized.Residuals <- MASS::stdres(fit)   
   
 # Extract fitted values for lm() object  
 Theoretical.Quantiles <- qqnorm(Residuals, plot.it = F)$x  
   
 # Square root of abs(residuals)  
 Root.Residuals <- sqrt(abs(Standardized.Residuals))  
   
 # Calculate Leverage  
 Leverage <- lm.influence(fit)$hat  
   
 # Create data frame   
 # Will be used as input to plot\_ly  
   
 regMat <- data.frame(Fitted.Values,   
 Residuals,   
 Standardized.Residuals,   
 Theoretical.Quantiles,  
 Root.Residuals,  
 Leverage)  
   
 # Plot using Plotly  
   
 # Fitted vs Residuals  
 # For scatter plot smoother  
 LOESS1 <- loess.smooth(Fitted.Values, Residuals)  
   
 plt1 <- regMat %>%   
 plot\_ly(x = Fitted.Values, y = Residuals,   
 type = "scatter", mode = "markers", hoverinfo = "x+y", name = "Data",  
 marker = list(size = 10, opacity = 0.5), showlegend = F) %>%   
 add\_trace(x = LOESS1$x, y = LOESS1$y, type = "scatter", mode = "line", name = "Smooth",  
 line = list(width = 2)) %>%   
 layout(title = "Residuals vs Fitted Values", plot\_bgcolor = "#e6e6e6", width = 1000)  
   
 # QQ Pot  
 plt2 <- regMat %>%   
 plot\_ly(x = Theoretical.Quantiles, y = Standardized.Residuals,   
 type = "scatter", mode = "markers", hoverinfo = "x+y", name = "Data",  
 marker = list(size = 10, opacity = 0.5), showlegend = F) %>%   
 add\_trace(x = Theoretical.Quantiles, y = Theoretical.Quantiles, type = "scatter", mode = "line", name = "",  
 line = list(width = 2)) %>%   
 layout(title = "Q-Q Plot", plot\_bgcolor = "#e6e6e6")  
   
 # Scale Location  
 # For scatter plot smoother  
 LOESS2 <- loess.smooth(Fitted.Values, Root.Residuals)  
   
 plt3 <- regMat %>%   
 plot\_ly(x = Fitted.Values, y = Root.Residuals,   
 type = "scatter", mode = "markers", hoverinfo = "x+y", name = "Data",  
 marker = list(size = 10, opacity = 0.5), showlegend = F) %>%   
 add\_trace(x = LOESS2$x, y = LOESS2$y, type = "scatter", mode = "line", name = "Smooth",  
 line = list(width = 2)) %>%   
 layout(title = "Scale Location", plot\_bgcolor = "#e6e6e6", width = 1000)  
   
 # Residuals vs Leverage  
 # For scatter plot smoother  
 LOESS3 <- loess.smooth(Leverage, Residuals)  
   
 plt4 <- regMat %>%   
 plot\_ly(x = Leverage, y = Residuals,   
 type = "scatter", mode = "markers", hoverinfo = "x+y", name = "Data",  
 marker = list(size = 10, opacity = 0.5), showlegend = F) %>%   
 add\_trace(x = LOESS3$x, y = LOESS3$y, type = "scatter", mode = "line", name = "Smooth",  
 line = list(width = 2)) %>%   
 layout(title = "Leverage vs Residuals", plot\_bgcolor = "#e6e6e6")  
   
 plt = list(plt1, plt2, plt3, plt4)  
 return(plt)  
}

t <- seq(0,3, length=52\*4)  
DemA <- c(rep(100,13), rep(200,13), rep(300,13), rep(400,13), rep(500,13), rep(650,13), rep(900,13),   
 rep(1000,13), rep(500,52), rep(250,52))  
DemB <- c(rep(500,13), rep(700,13), rep(1000,13), rep(1250,13), rep(1500,13), rep(2000,13), rep(1000,13),   
 rep(900,13), rep(450,52), rep(100,52))  
DemC <- c(rep(0,13), rep(0,13), rep(0,13), rep(100,13), rep(850,13), rep(1250,13), rep(1500,13),   
 rep(1250,13), rep(600,52), rep(300,52))

## Loading required package: ggplot2

##   
## Attaching package: 'plotly'

## The following object is masked from 'package:ggplot2':  
##   
## last\_plot

## The following object is masked from 'package:stats':  
##   
## filter

## The following object is masked from 'package:graphics':  
##   
## layout

plot\_ly(x = ~t, y= ~DemA, name = "demand A", type = 'scatter', mode='lines') %>%  
 add\_trace(y= ~DemB, name = "demand B", mode='lines') %>%  
 add\_trace(y= ~DemC, name='demand C', mode='lines') %>%  
 layout(title= "Forecasted Weekly Demand",   
 yaxis=list(title="Demand in units"),  
 xaxis=list(title="Time from Q1 '17"))

## PhantomJS not found. You can install it with webshot::install\_phantomjs(). If it is installed, please make sure the phantomjs executable can be found via the PATH variable.

## Warning in arrange\_impl(.data, dots): '.Random.seed' is not an integer  
## vector but of type 'NULL', so ignored

linInt <- lm(DemA[1:(52\*2)] ~ t[1:(52\*2)])  
plt = RegressionPlots(linInt)

## [[1]]

## A marker object has been specified, but markers is not in the mode  
## Adding markers to the mode...

## A line object has been specified, but lines is not in the mode  
## Adding lines to the mode...

##   
## [[2]]

## A marker object has been specified, but markers is not in the mode  
## Adding markers to the mode...  
## A line object has been specified, but lines is not in the mode  
## Adding lines to the mode...

##   
## [[3]]

## A marker object has been specified, but markers is not in the mode  
## Adding markers to the mode...  
## A line object has been specified, but lines is not in the mode  
## Adding lines to the mode...

##   
## [[4]]

## A marker object has been specified, but markers is not in the mode  
## Adding markers to the mode...  
## A line object has been specified, but lines is not in the mode  
## Adding lines to the mode...

fit2 <- lm( DemA[(52\*2):(52\*4)] ~ t[(52\*2):(52\*4)] )  
lw <- loess(DemA ~ t)  
  
p1 <- plot\_ly(x = ~t) %>%  
 add\_lines(y= ~DemA, name = "demand A", line=list(shape="linear")) %>%  
 add\_trace(x=t[1:(52\*2)], y=fitted(linInt), name="Demand A to peak", mode='lines') %>%  
 add\_trace(x=t[(52\*2):(52\*4)], y=fitted(fit2), name="Demand A post-peak", mode='lines') %>%  
 add\_lines(y = ~fitted(loess(DemA ~ t)), name="Smoothed Demand")  
  
p1

## No trace type specified:  
## Based on info supplied, a 'scatter' trace seems appropriate.  
## Read more about this trace type -> https://plot.ly/r/reference/#scatter  
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t2 <- seq(0,9)  
DemA2 <- c(100, 200, 300, 400, 500, 650, 900,1000, 500,250)  
capacity <- c(100, 250, 390, 431, 619, 666, 1008, 1070, 619, 250)  
  
p2 <- plot\_ly(x = t2, y = DemA2, type="bar", name="Demand") %>%  
 add\_trace(y= capacity, name = "Capacity", type="scatter", mode='lines')  
  
print(p2)