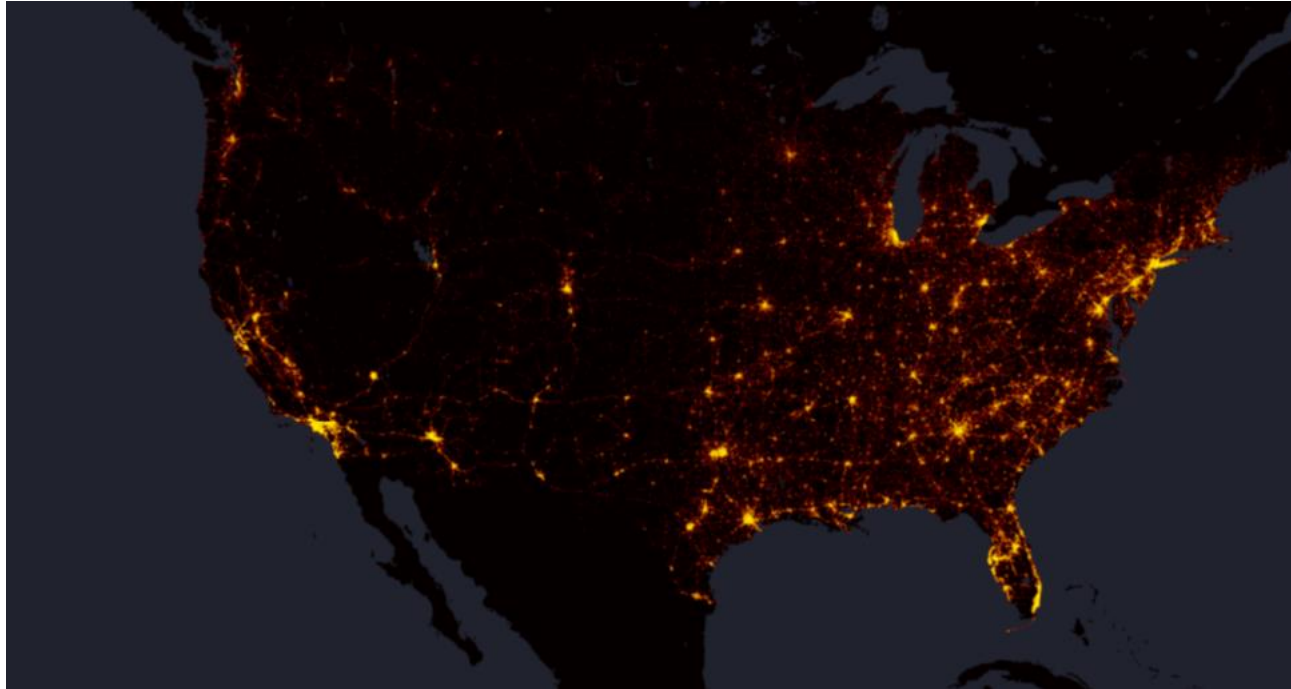


# **Time Series Analysis of Traffic Collision in LA**

**Sarfaraz Alam**

# Background



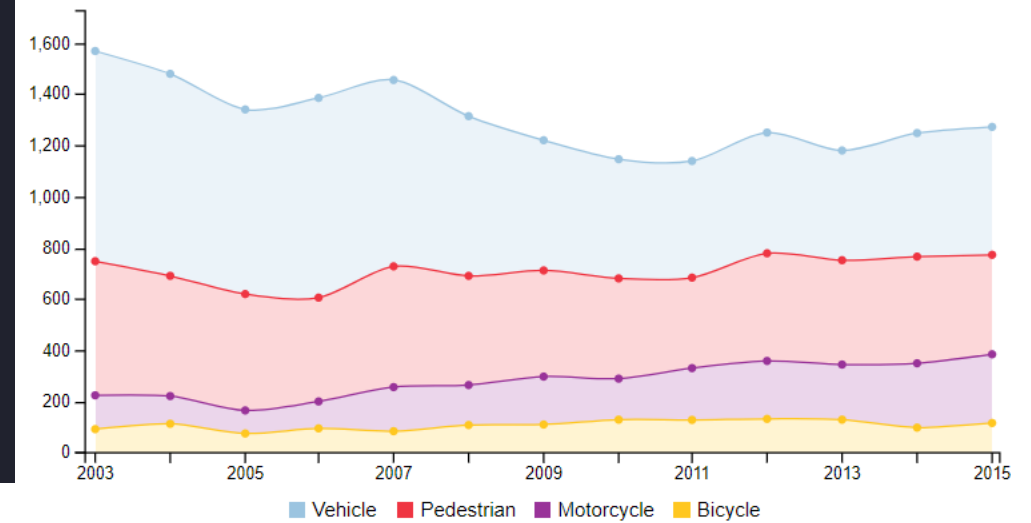
■ Pedestrian

Primary Travel Mode for all trips

\* Los Angeles County

■ Pedestrian

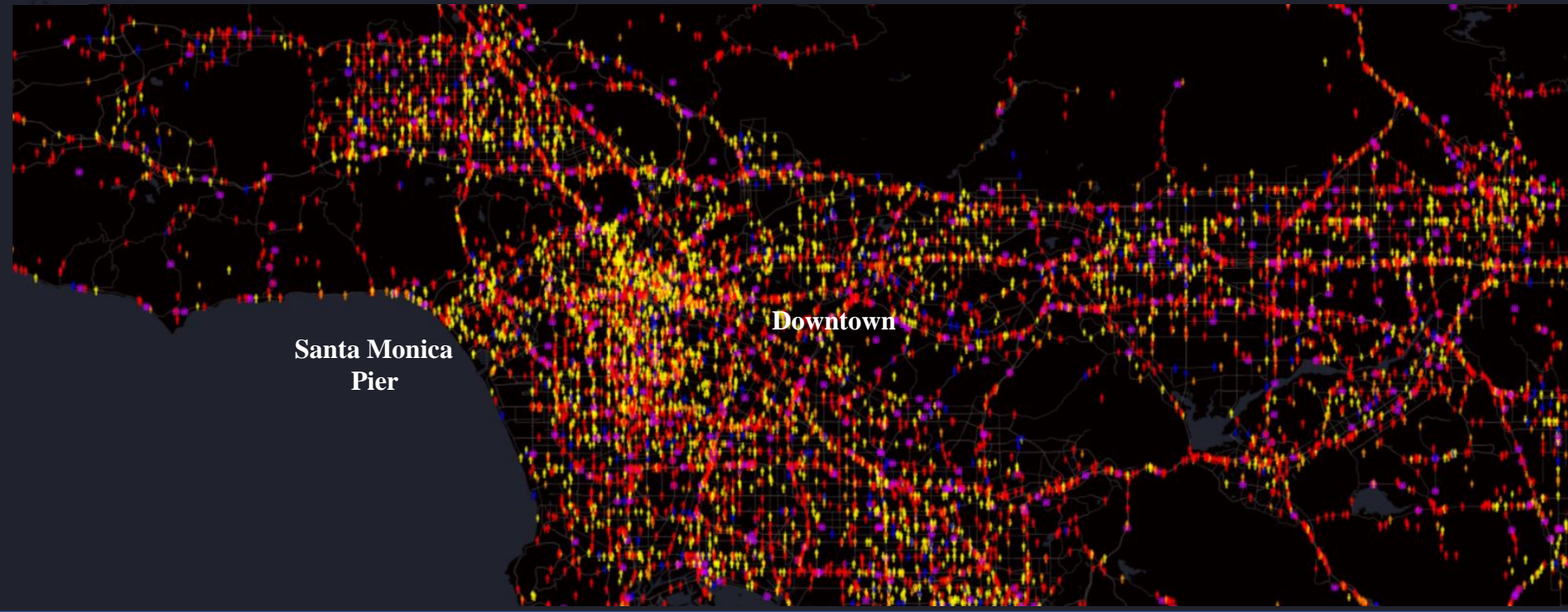
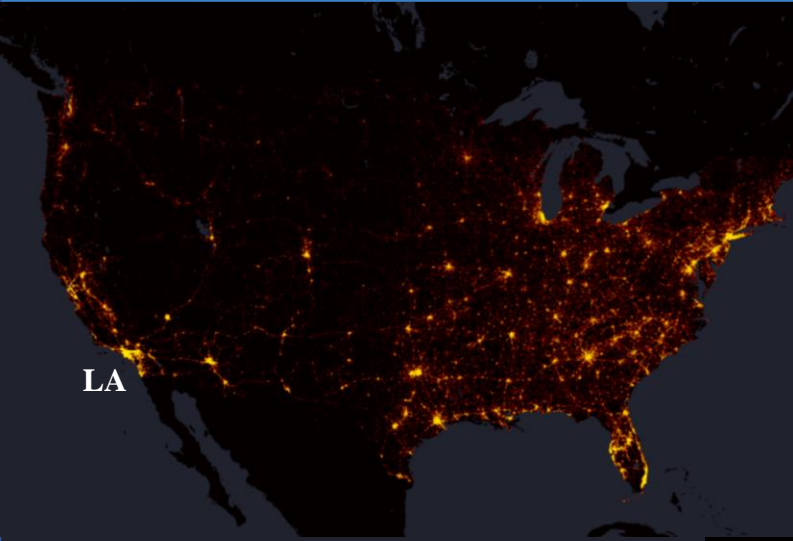
People Killed or Severely Injured



Los Angeles Annual Traffic Fatalities and Severe Injuries

\* 2014 and 2015 data is provisional

# Background

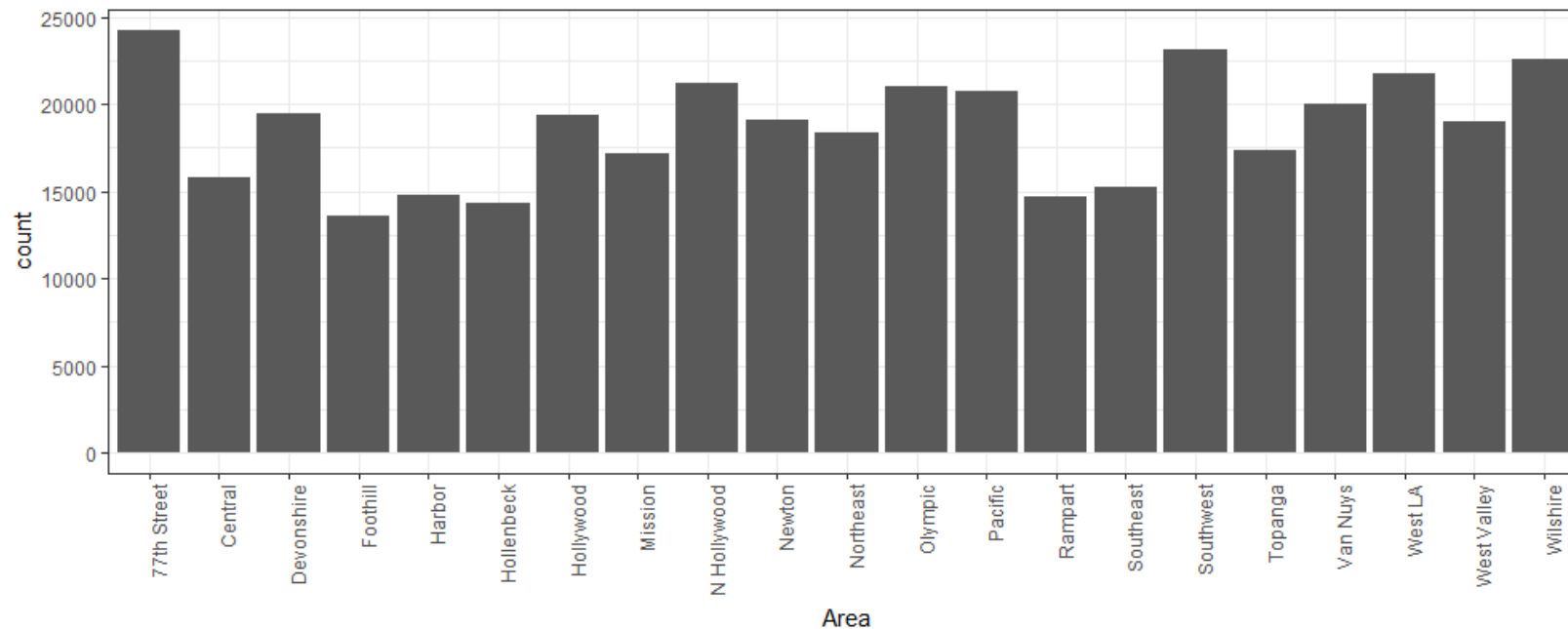


# Data

Traffic collision in Los Angeles area downloaded from Los Angeles Open Data source

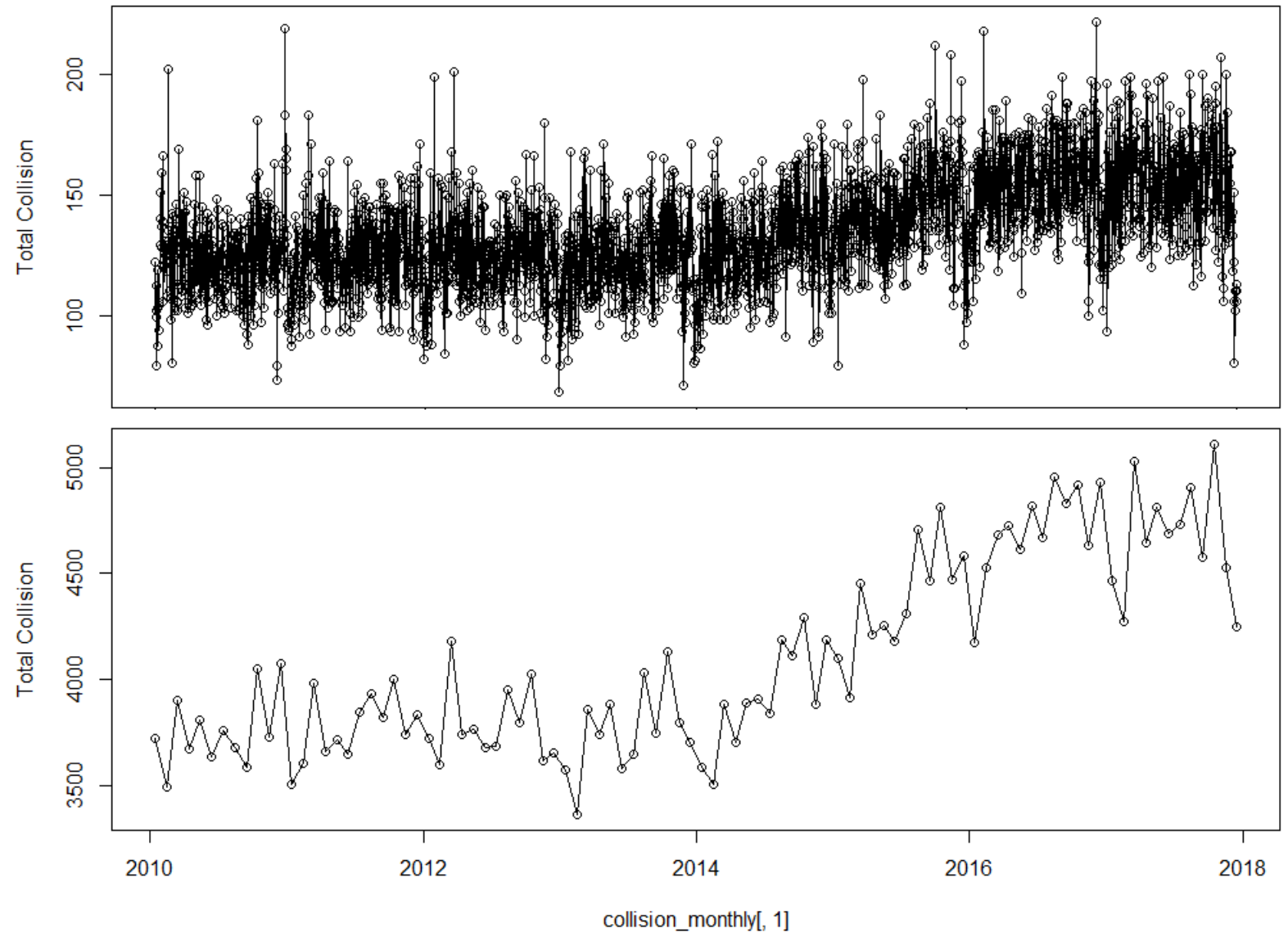
<https://data.lacity.org/A-Safe-City/Traffic-Collision-Data-from-2010-to-Present/d5tf-ez2w>

The primary variable for this study is the count of incidents.



# Initial Observation

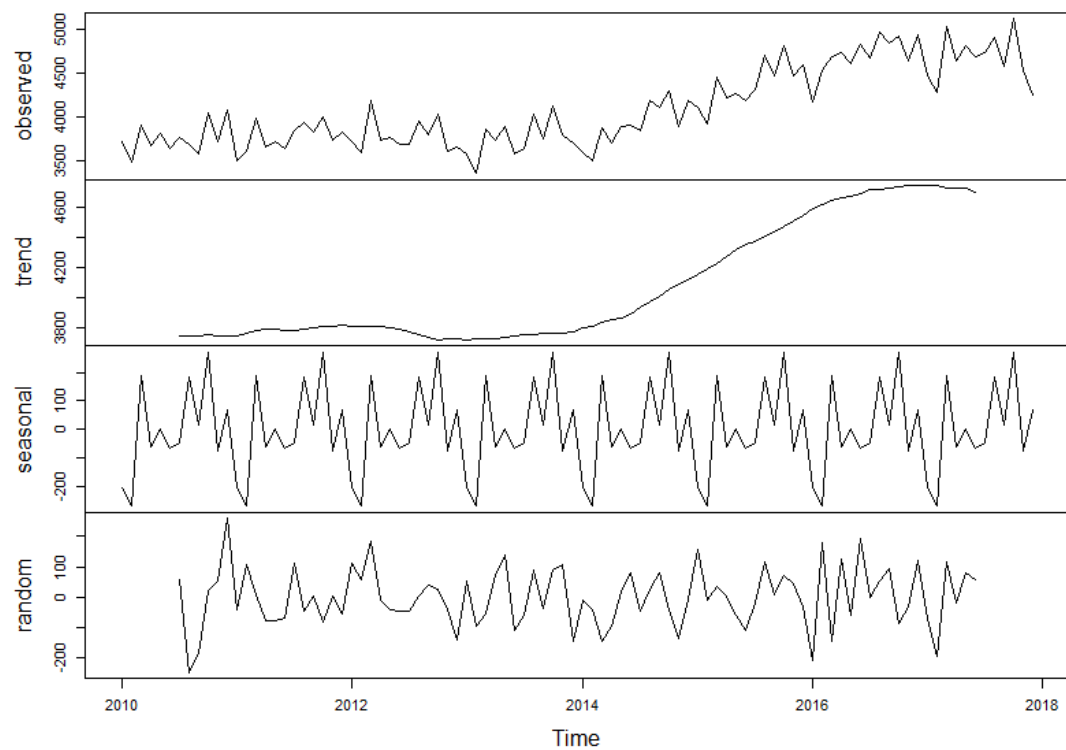
**392686** observation from 2010 to 2017



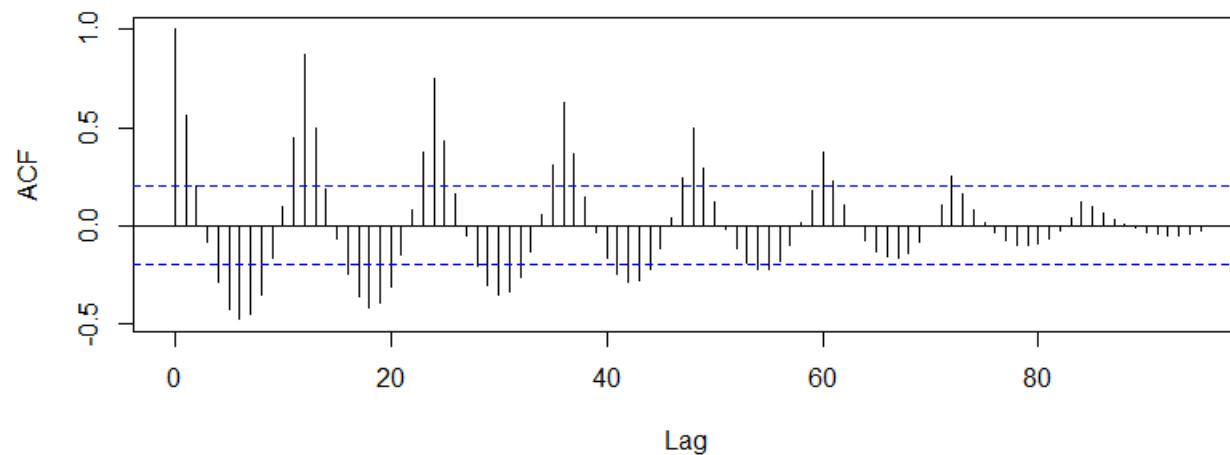
# Initial Observation

**392686** observation from 2010 to 2017

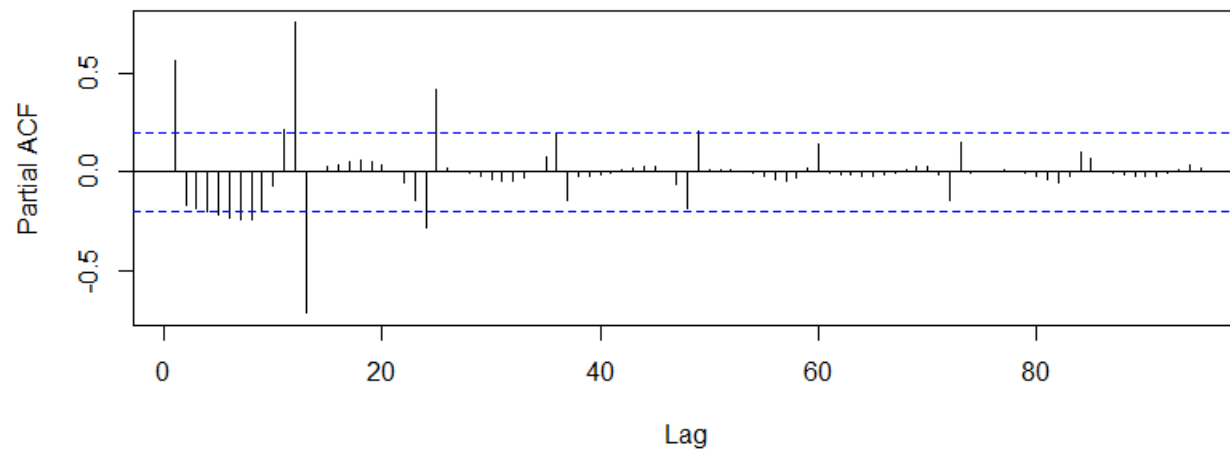
**Decomposition of additive time series**



**ACF of original data**

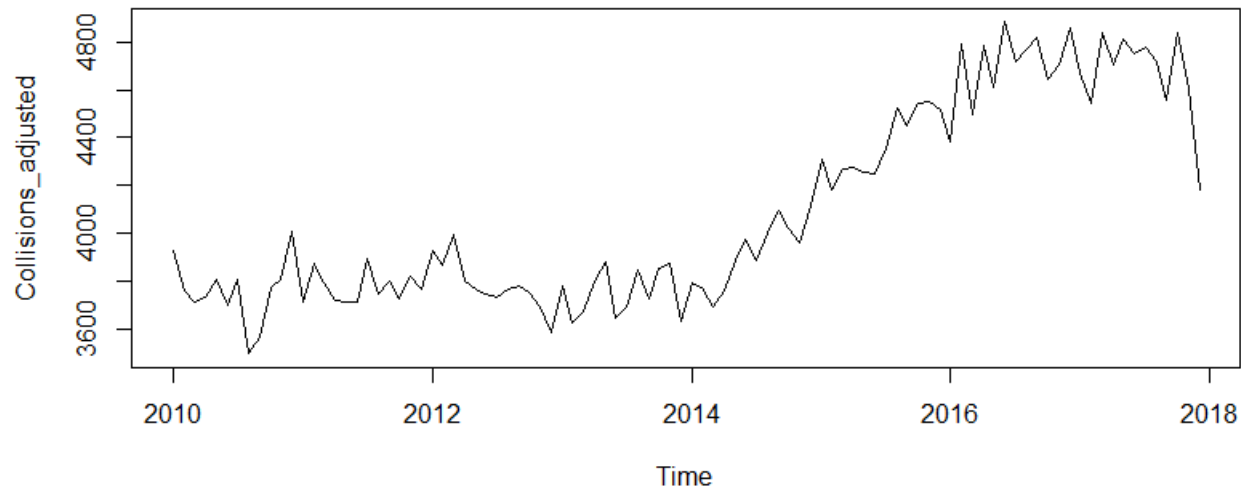


**PACF of original data**

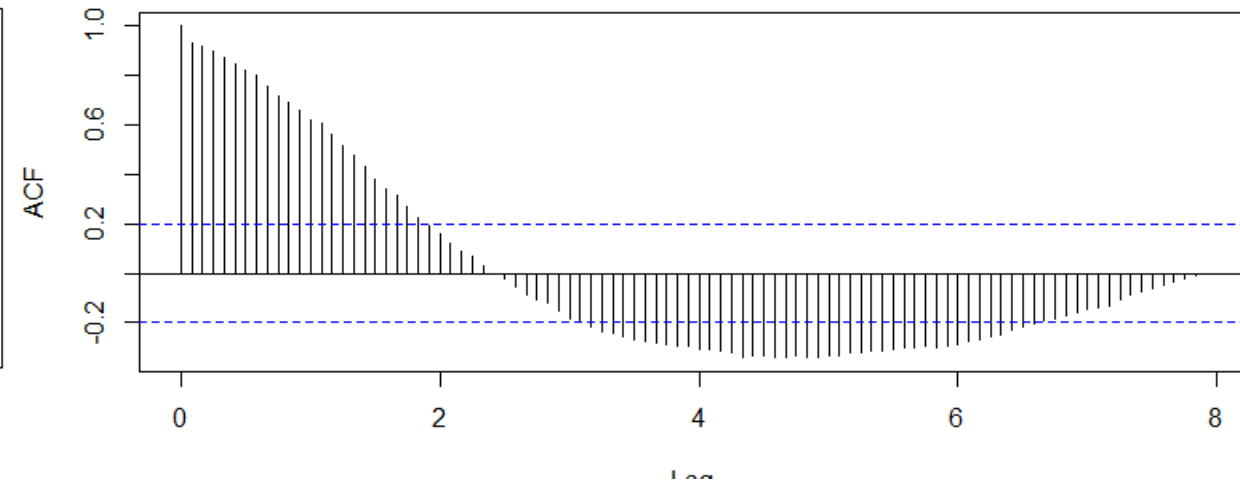


# ACF and PACF

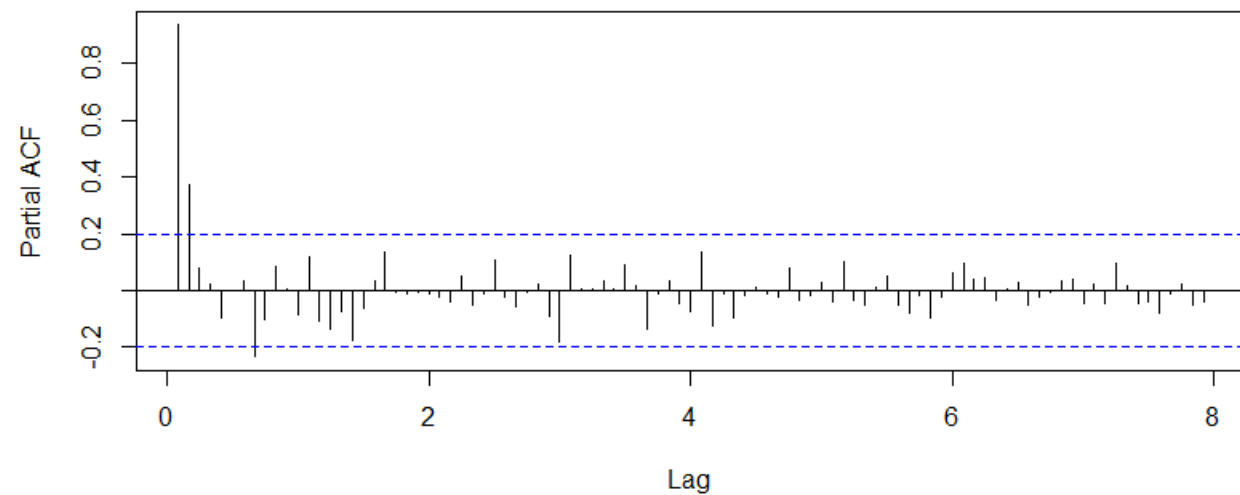
Data after seasonality removed



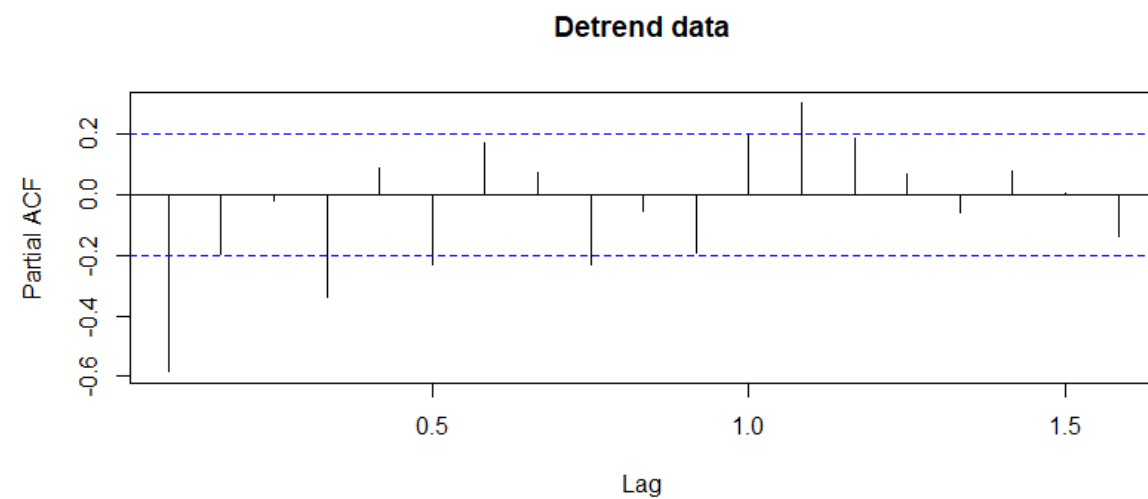
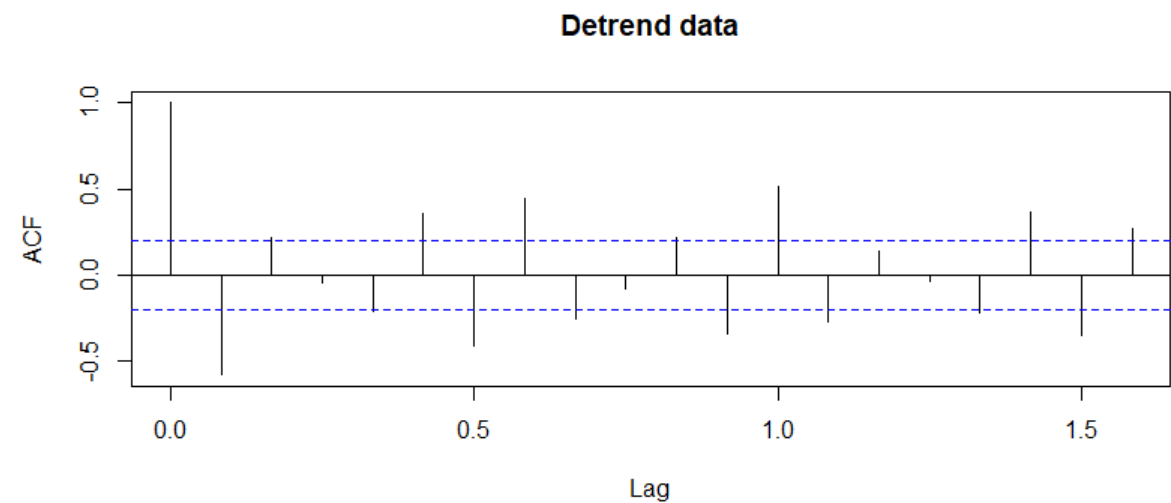
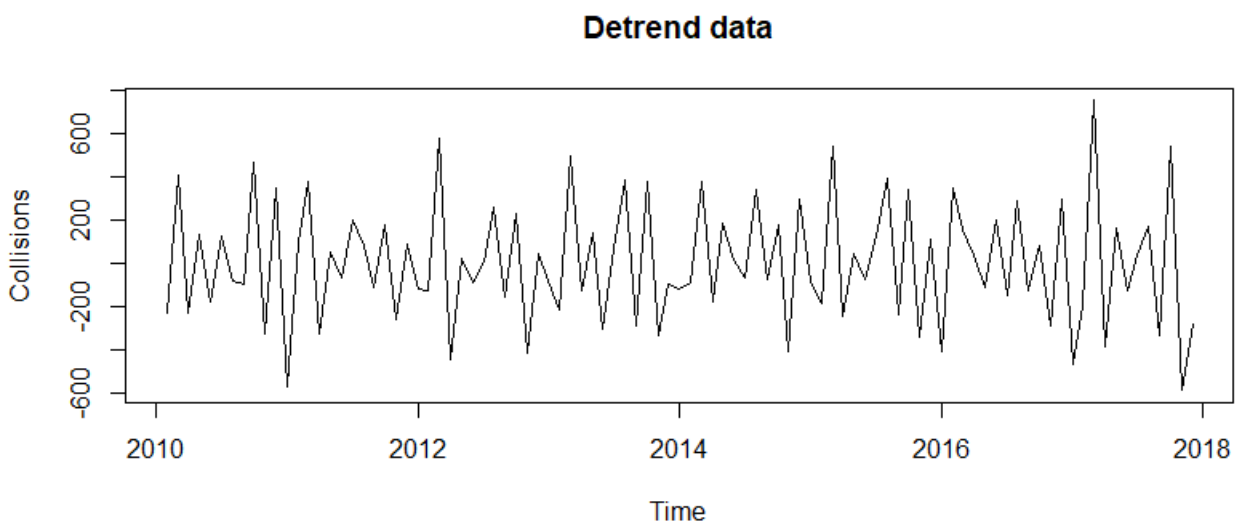
Seasonality removed



Seasonality removed

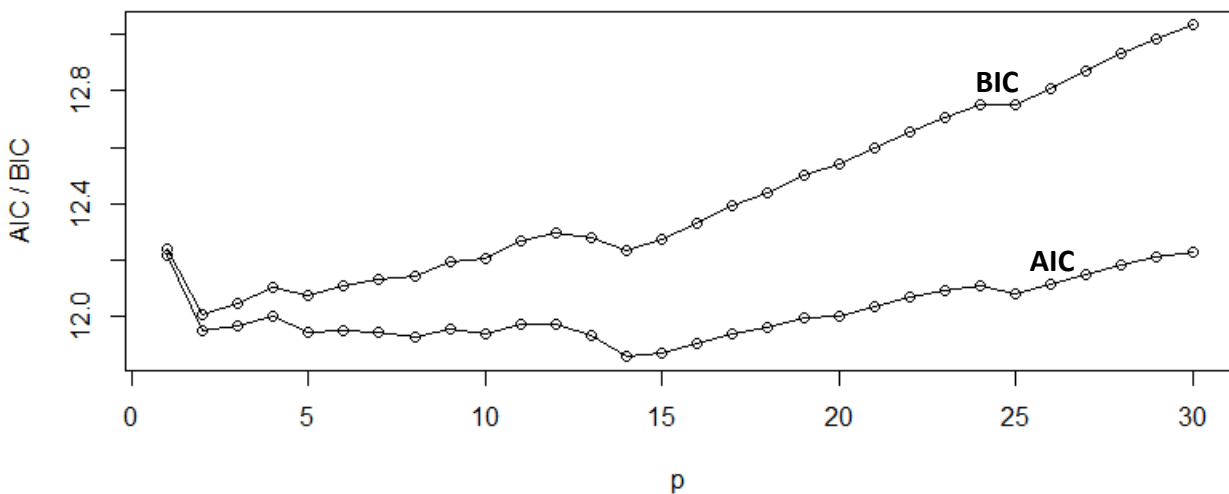


# ACF and PACF

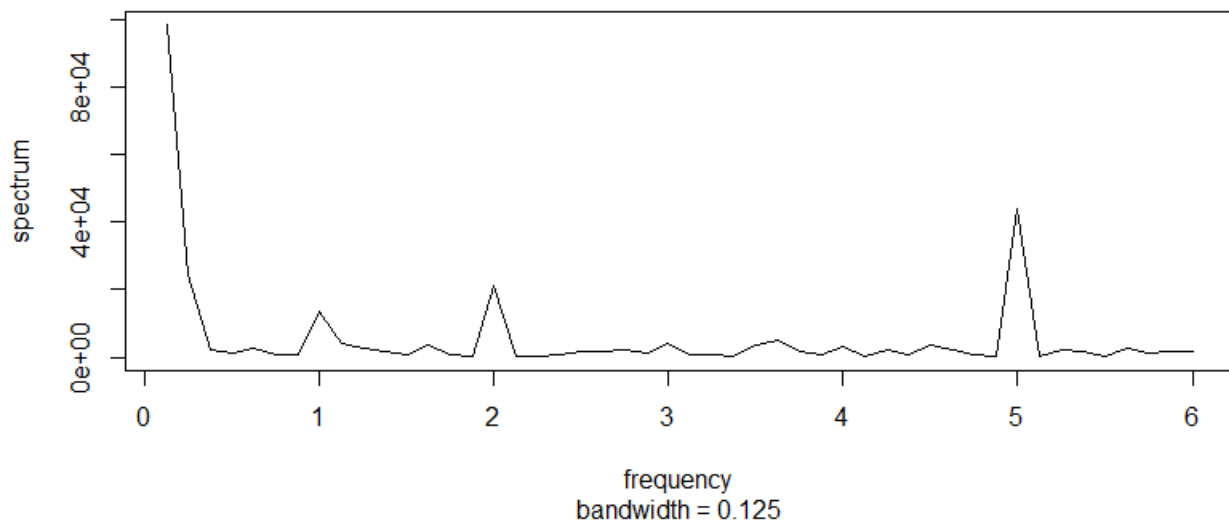




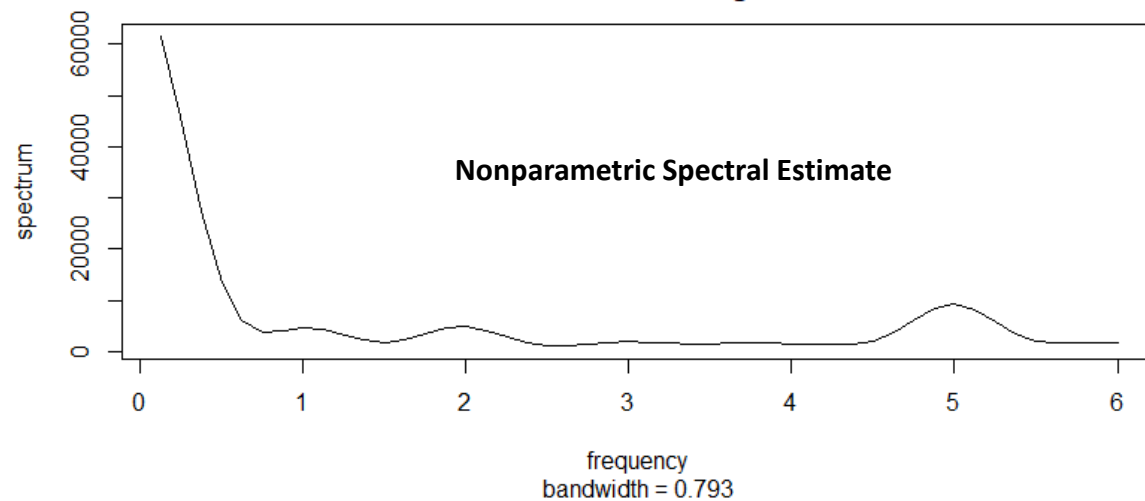
# Frequency Analysis



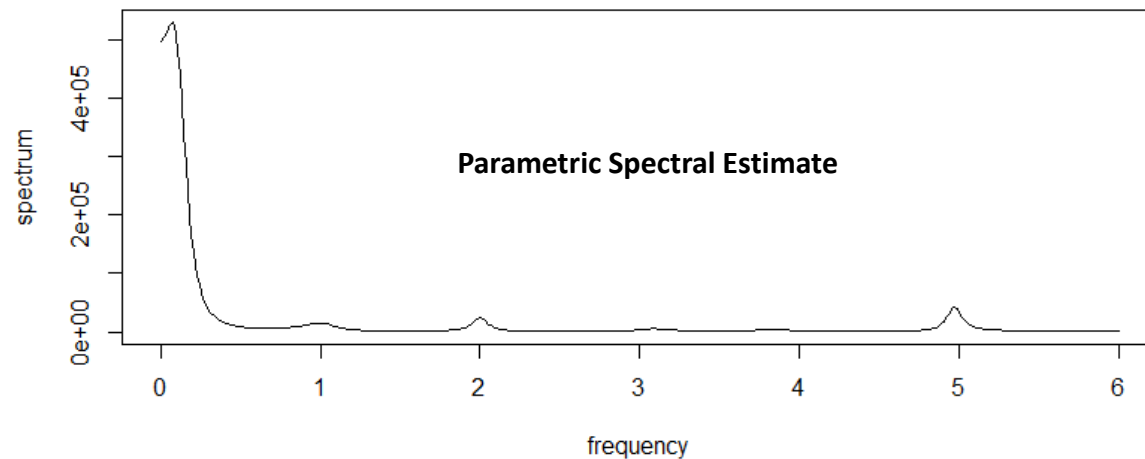
Raw Periodogram



Series: monthly\_ts  
Smoothed Periodogram

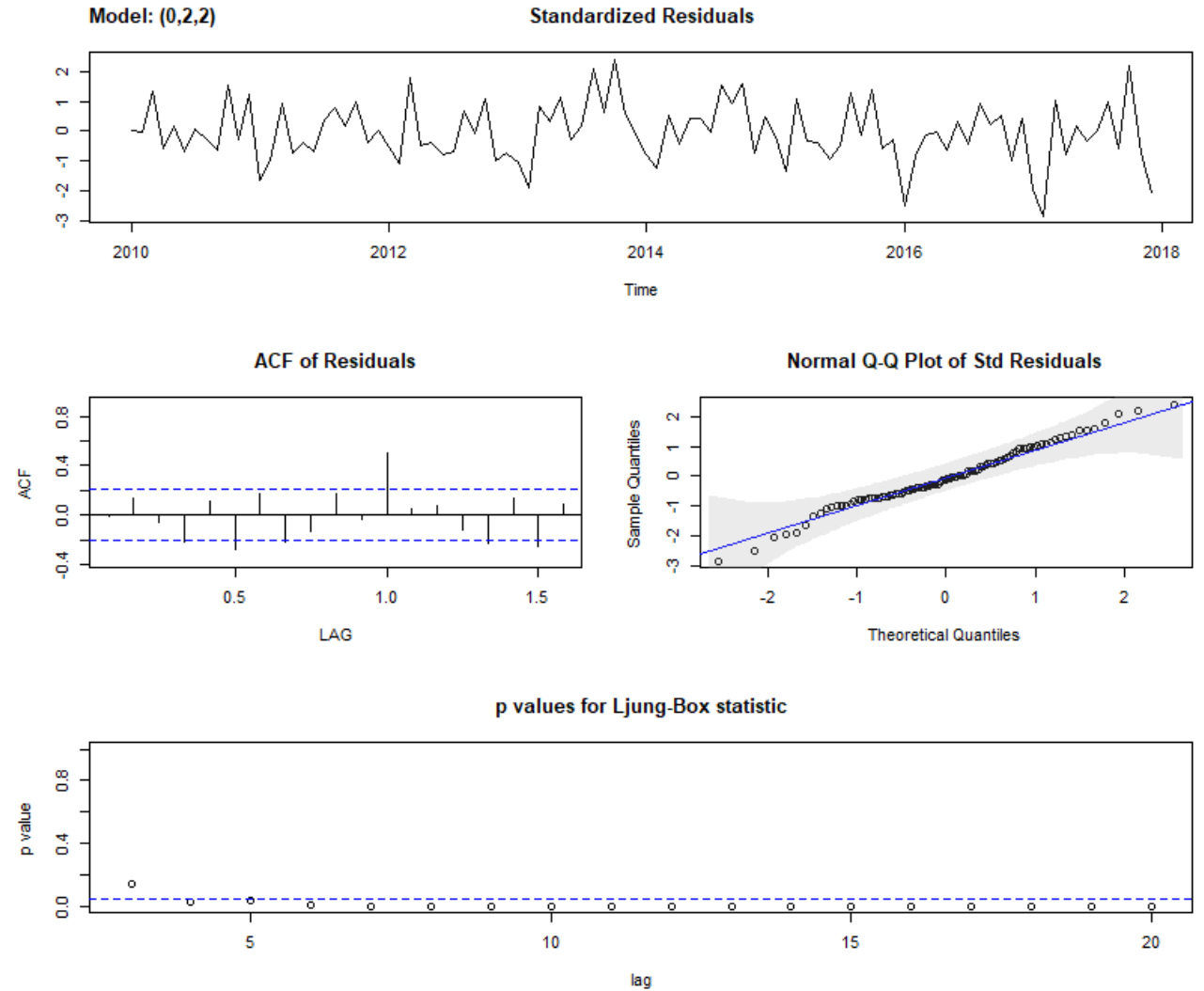


Series: monthly\_ts  
AR (14) spectrum



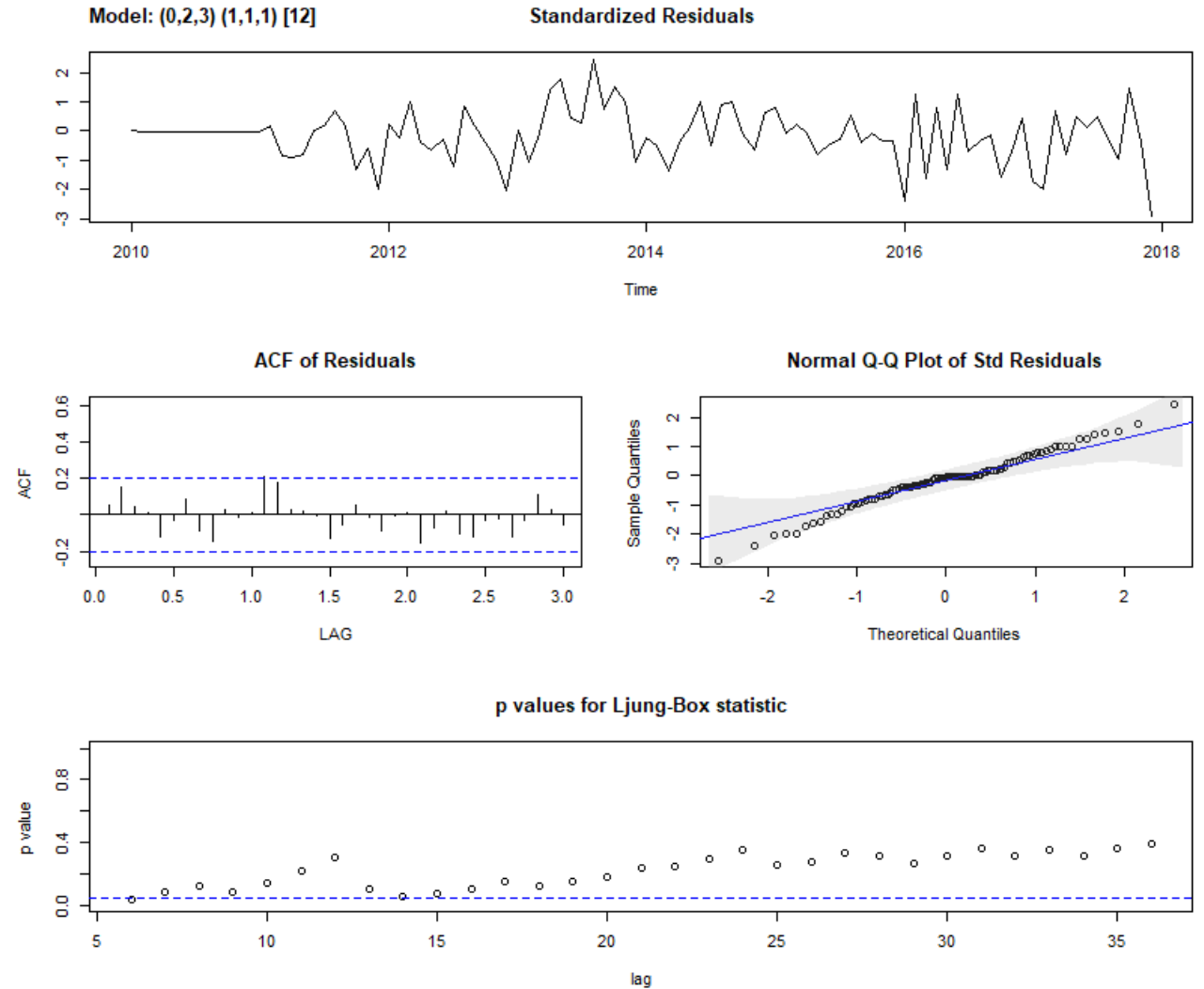
# Model Fitting

Model	AIC
ARIMA(0,0,0)	13.22043
ARIMA(0,0,1)	12.77707
ARIMA(0,0,2)	12.40468
ARIMA(0,0,3)	12.21377
ARIMA(0,0,4)	12.11902
ARIMA(0,0,5)	12.12467
ARIMA(0,1,0)	12.28702
ARIMA(0,1,1)	11.77801
ARIMA(0,1,2)	11.78555
ARIMA(0,1,3)	11.78667
ARIMA(0,1,4)	11.7945
ARIMA(0,2,0)	13.42437
ARIMA(0,2,1)	12.2976
<b>ARIMA(0,2,2)</b>	<b>11.66238</b>



# Model Fitting

ARIMA Model	AIC	BIC
ARIMA(0,1,4)(1,0,1)[12]	<b>11.03225</b>	<b>10.21923</b>
ARIMA(0,1,4)(1,0,1)[12]	11.93964	11.01977
ARIMA(0,1,2)(1,0,0)[12]	11.32291	10.42976
ARIMA(0,3,1)(0,1,1)[12]	12.25974	11.33987



# Next Step

- Collision Prediction
- Collision Pattern comparison West LA and East LA