1.The ACF Plot:

It peaked at the beginning and then fell to below 0, and then fluctuated in a small range between below 0 and-0.2. In the beginning, as one time series increases, duaration also increases, then a value close to 0 implies weak or no correlation.

In the beginning, the spikes (correlation values) lie outside Blue shaded region, meaning the start\_time and duration is considered statistically significant, then they lie inside the band, they might have arisen from random noise.

I think because of Covid, it change people trip behaviors.

2.Visual

The data is from 2018.01 to 2022.12 motorbike used data, I cleaned the data, only start\_time and duration and passholder\_type, then I choose Monthly Pass’s data. Visualize the forecasts from each method on the same plot to see how they compare visually with the actual data. Seasonal naive model is the most near the actual data.

3.Accuracy

Forecasts from mean is from 2018 to 2022.12, is 5 years, is easy to see is seasonality, and the trand in 2023 is between 0 to 12000, so the mean of forecast

# Mean\_forecast

ME RMSE MAE MPE MAPE MASE ACF1

Training set 0 4151.922 3440.633 -15.18055 35.40828 0.6500449 0.7372574

# Naive Method

ME RMSE MAE MPE MAPE MASE ACF1

Training set -2.644068 3033.633 2017.458 -3.643071 18.22563 0.3811618 -0.188889

# Seasonal Naive

ME RMSE MAE MPE MAPE MASE ACF1

Training set -298.0417 6526.044 5292.917 -23.47294 58.81106 1 0.8189926

# Random Walk with a drift

ME RMSE MAE MPE MAPE MASE ACF1

Training set -6.782875e-13 3033.631 2016.965 -3.617298 18.21703 0.3810687 -0.188889

# Decomposition

ME RMSE MAE MPE MAPE MASE ACF1

Training set 10.58168 2922.169 2075.716 -4.313537 18.89908 0.3921687 0.04305666

# Forecast

ME RMSE MAE MPE MAPE MASE ACF1

Training set 10.58168 2922.169 2075.716 -4.313537 18.89908 0.3921687 0.04305666

ME RMSE MAE MPE MAPE MASE ACF1

Training set 10.58168 2922.169 2075.716 -4.313537 18.89908 0.3921687 0.04305666

# Moving Averages

#MA5

ME RMSE MAE MPE MAPE

Test set 65.52143 2078.897 1533.164 -3.626935 14.57172

#MA9

ME RMSE MAE MPE MAPE

Test set -23.2265 2234.898 1558.739 -5.839352 14.97684

Comparing the accuracy of these metrics, the smallest ME is -298.0417 of Seasonal Naive, the smallest RMSE is 2922.169 of Decomposition or Forecast1 and 2, the smallest MAE is 2016.965 of Random Walk, the smallest MAPE is 18.21703 of Random Walk.

Only picking one accuracy measures, Random Walk with a drift is the best, they have the smallest MAE and MAPE.