Sedef Ece Akansel
2148500

# HOMEWORK 3 REPORT

1. Which method seems to have the best results?

Holt's linear trend method works best because it considers trend and seasonality. It gives better RMSE results.

2. The effect of the smoothing approaches on stationarity and RMSE.

Smoothing data gives better estimations as it eliminates the effect of trend and seasonality. Moving average approach is better than random approach. But moving average approached lagged, so it is not a convenient approach to get real time estimations.

3. Choosing a window size of 60 (minutes) to smooth using moving averages, would impose an artificial lag of 60 minutes on observing changes in trend. Knowing this, would you change your window size? Would your decision be different for both estimations (next 2 minutes, next day)?

Setting window size to 1440 for next day will give a better result.

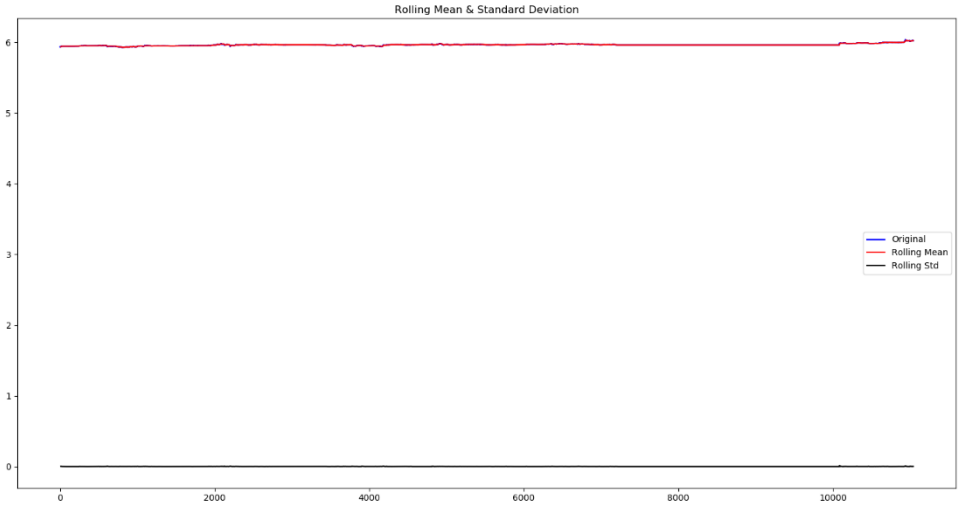


Figure_1_DataStationary

Results of Dickey-Fuller Test:

| | |
|---|---|
| Test Statistic | -1.612920 |
| p-value | 0.476443 |
| #Lags Used | 2.000000 |
| Number of Observations Used | 11036.000000 |
| Critical Value (1%) | -3.430943 |
| Critical Value (5%) | -2.861802 |
| Critical Value (10%) | -2.566909 |

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Dollar estimation: 6.023640040905142

Estimate holt RMSE: 0.0042999999999997485

Dollar estimation: 6.023640040905142

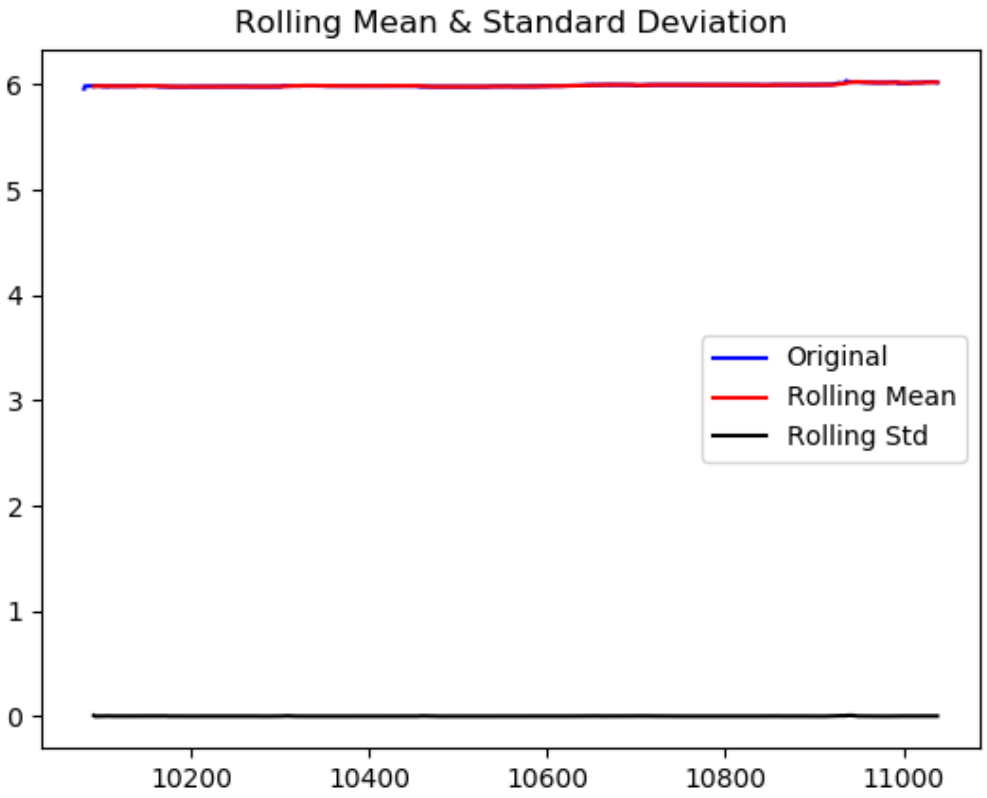
estimate HOLT: 6.0236

actual: 6.0193

Naive estimate: 6.0193

RMSE for holt estimation: 0.0042999999999997485

RMSE for naive estimation: 0.0




**May 6**

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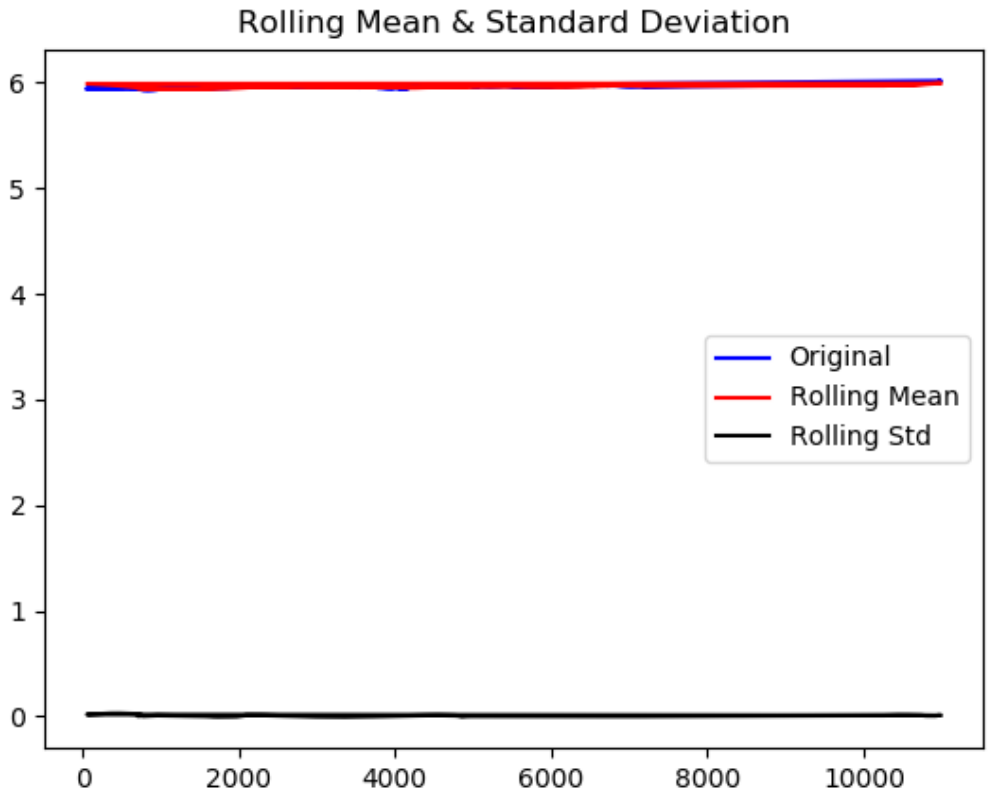


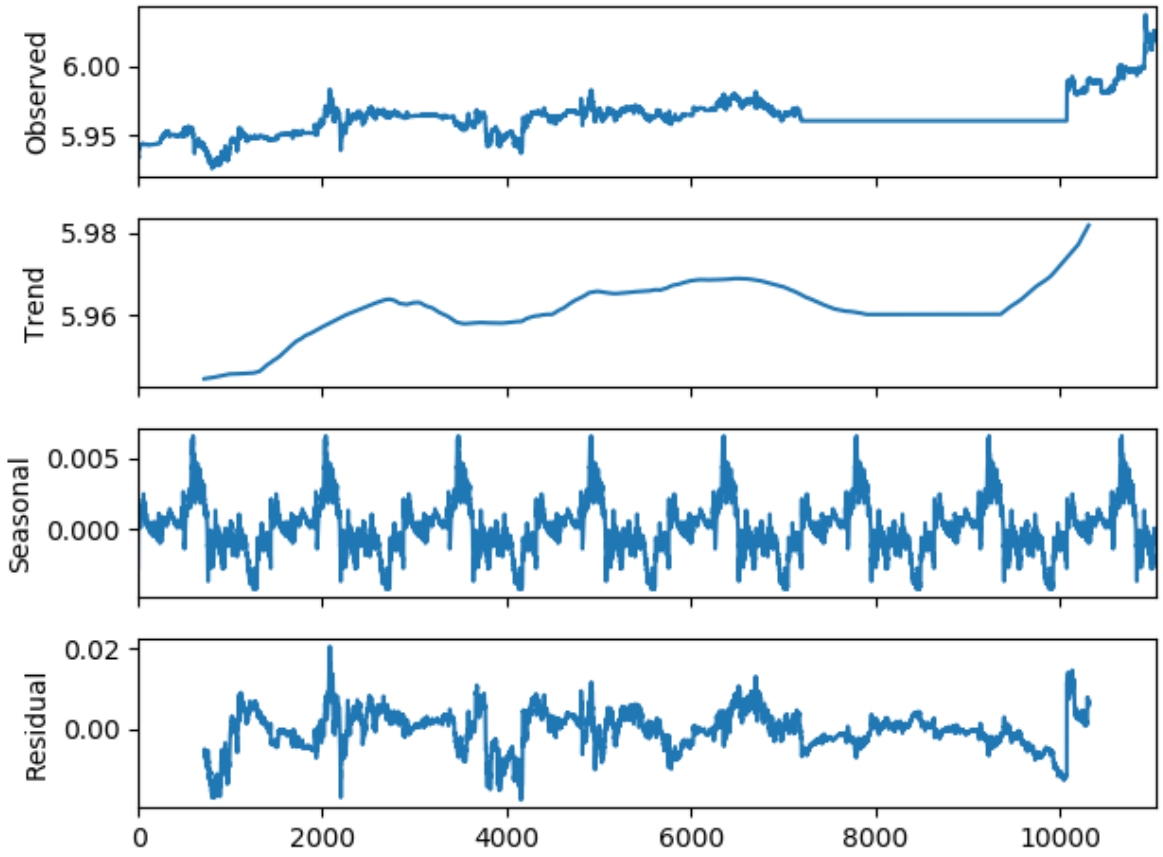

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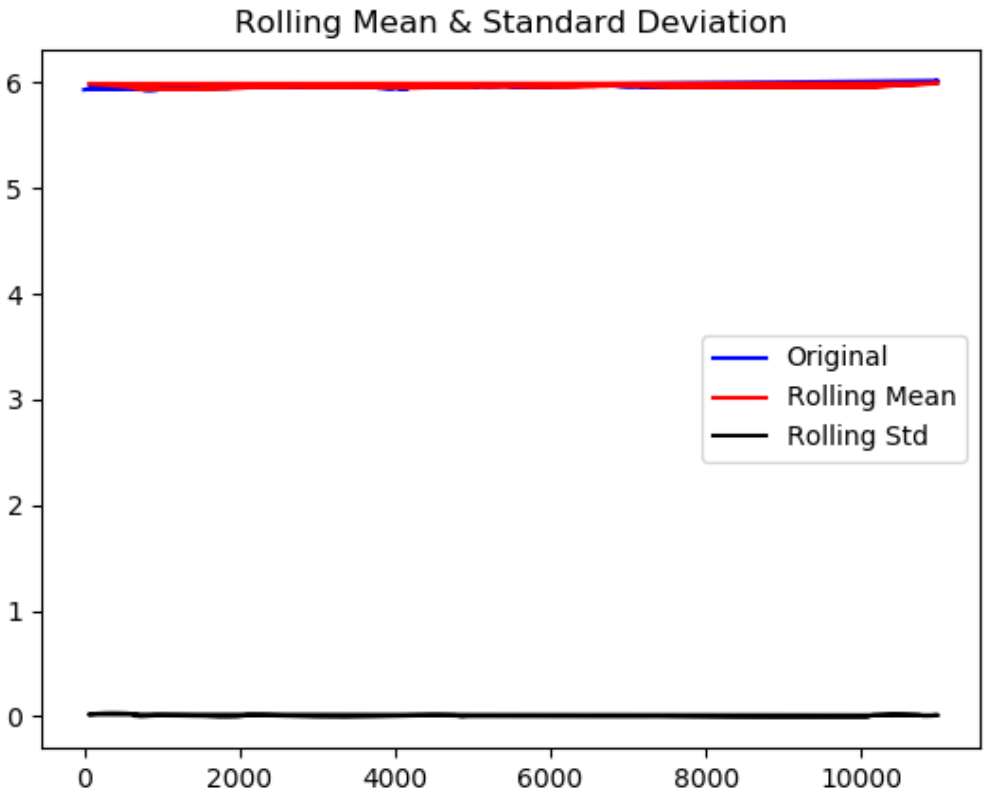


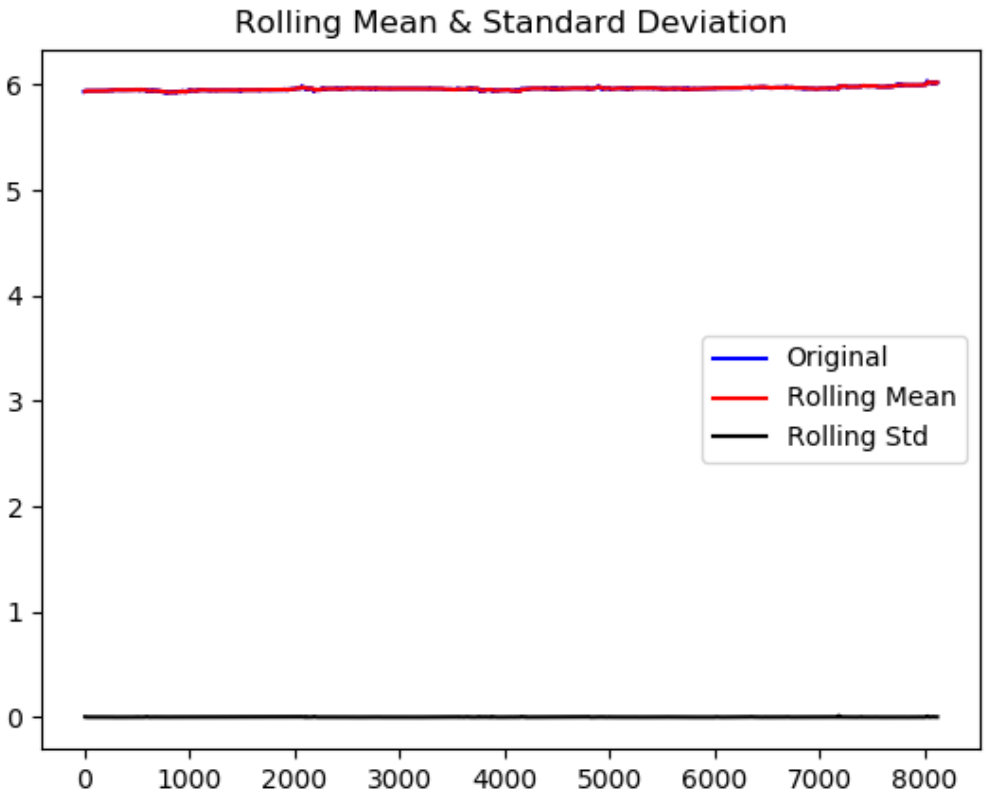

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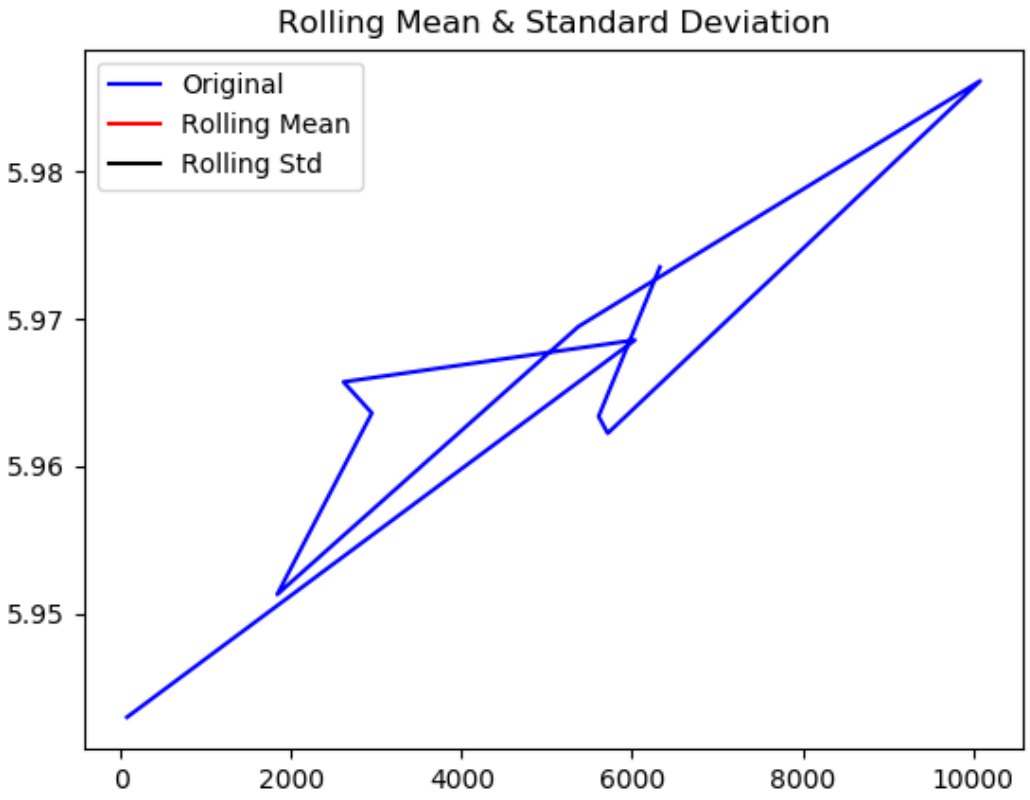
3a check stationarity (save the plots)




3C one random (representative) pick from each hour