ASSIGNMENT 5 ARIMA AND ARMA

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An ARMA model, or Autoregressive Moving Average model, is used to describe weakly stationary stochastic time series in terms of two polynomials. The first of these polynomials is for autoregression, the second for the moving average.
Often this model is referred to as the **ARMA(p,q) model**; where:

- p is the order of the autoregressive polynomial,
- q is the order of the moving average polynomial.

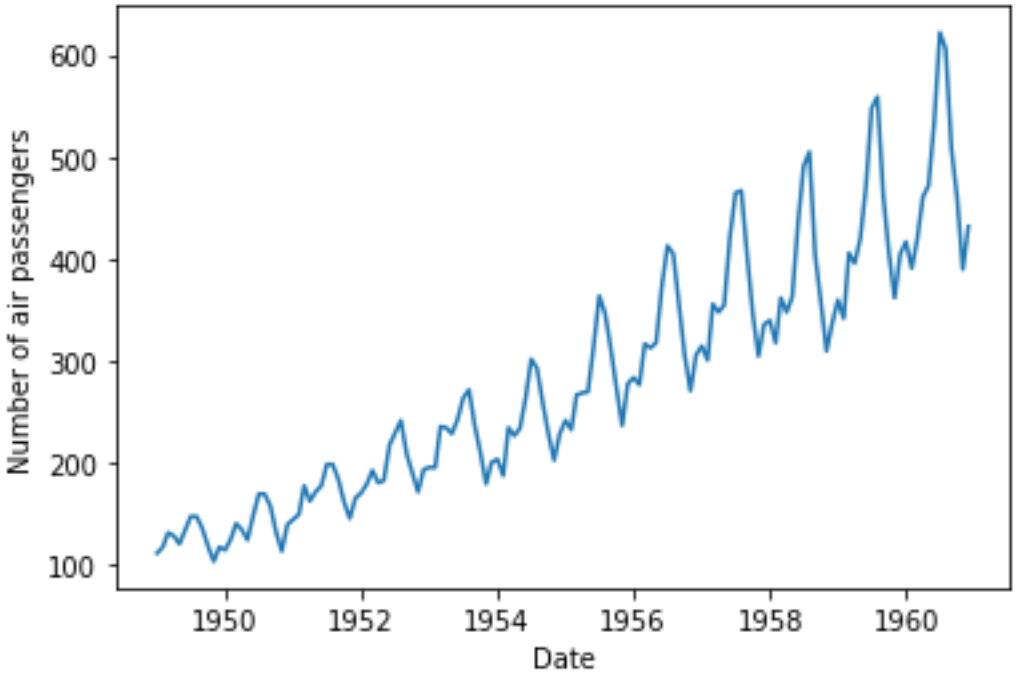
The equation is given by:

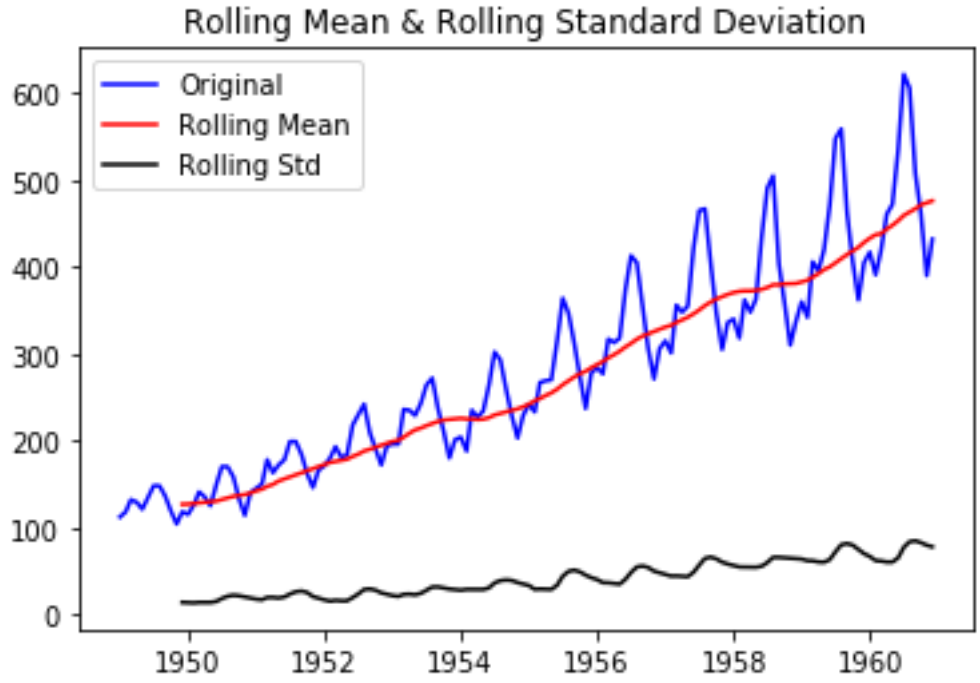
$$X_t = c + \varepsilon_t + \sum_{i=1}^{p} \varphi_i X_{t-i} + \sum_{i=1}^{q} \theta_i \varepsilon_{t-i}.$$

Where:

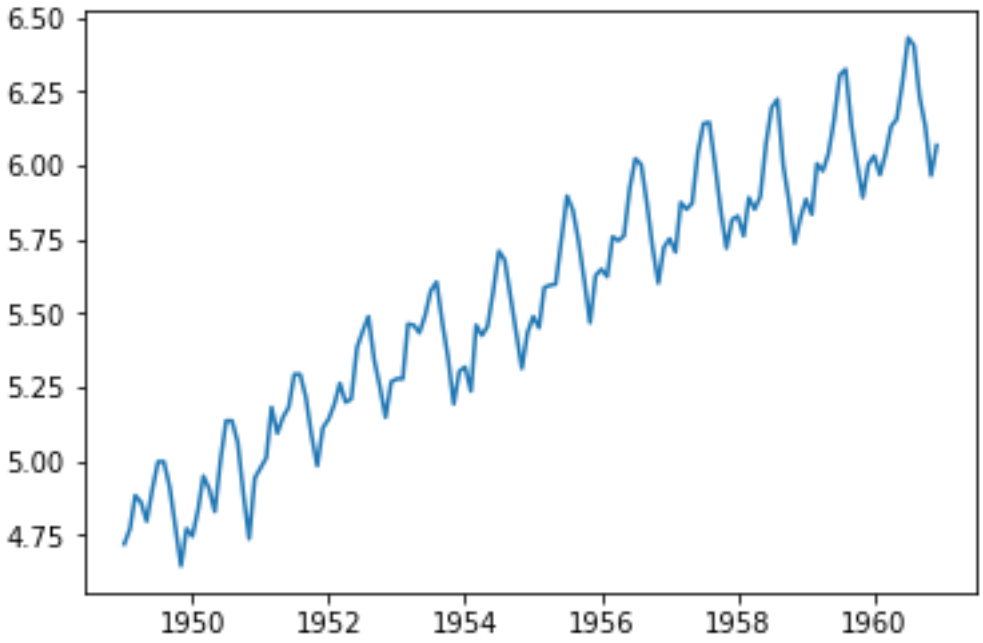
- ϕ = the autoregressive model's parameters,
- θ = the moving average model's parameters.
- c = a constant,
- ε = error terms (white noise).

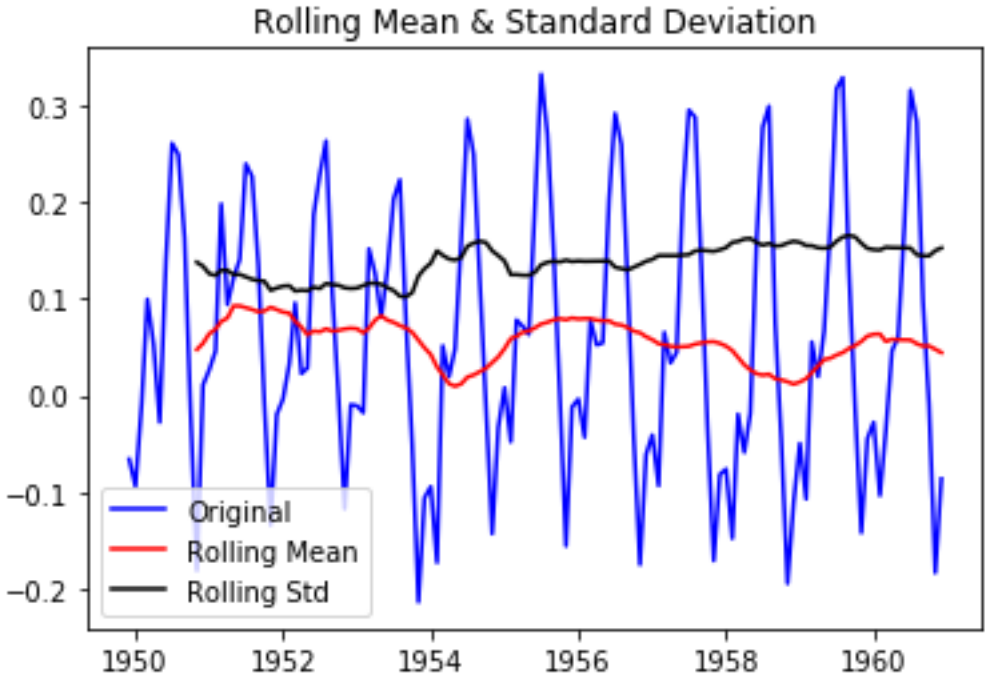
DATASET :AIRPASSENGER



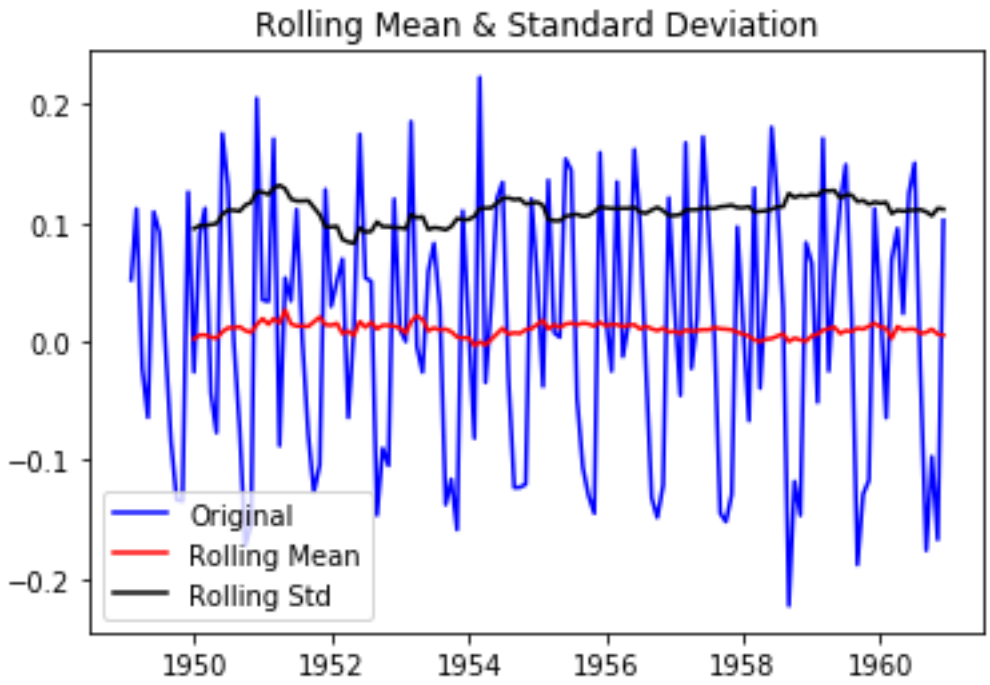


Applying log

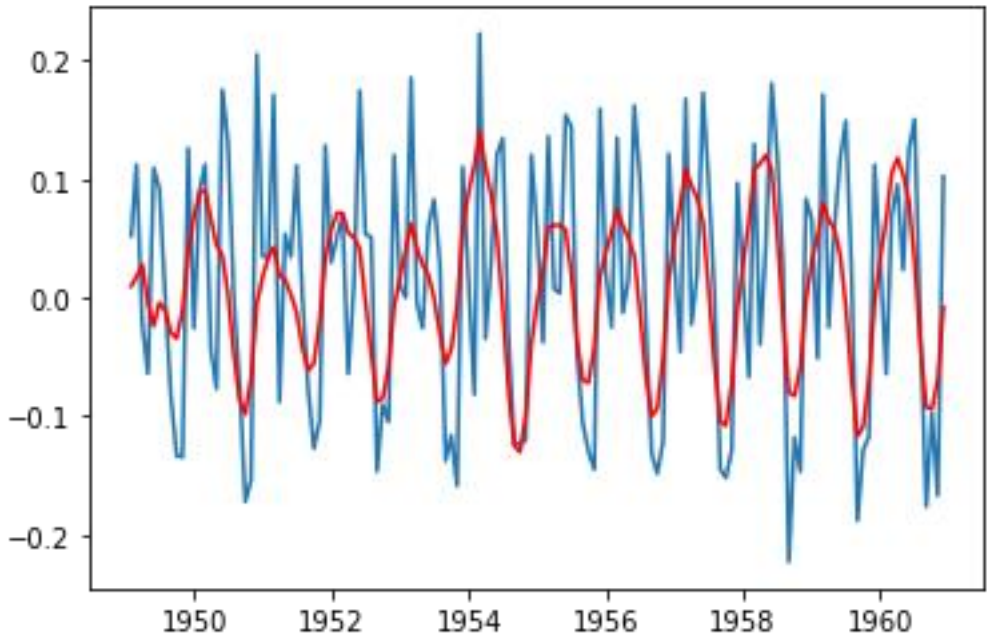




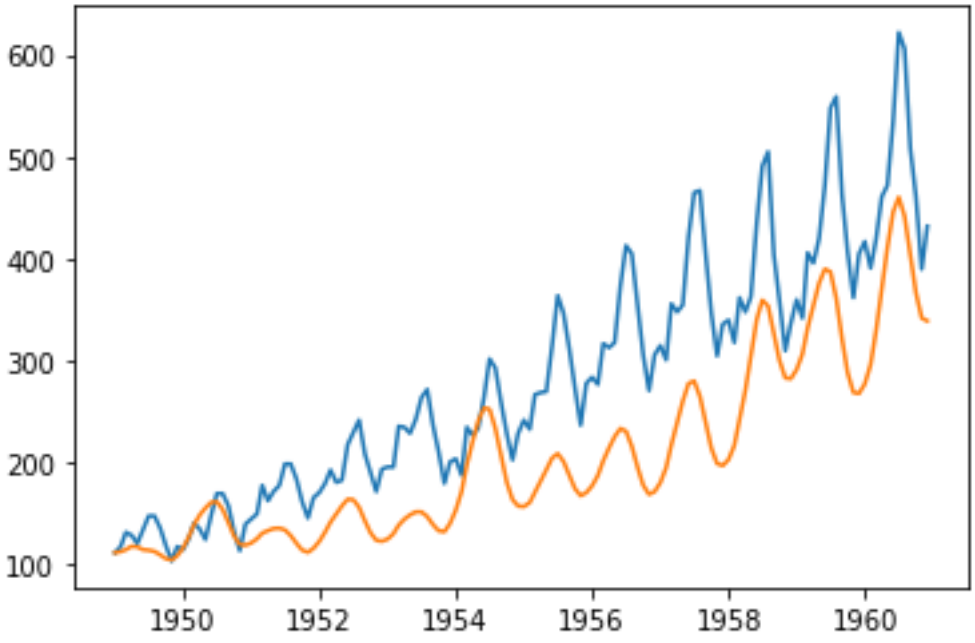

```
df_log_shift = df_log - df_log.shift()
df_log_shift.dropna(inplace=True)
get_stationarity(df_log_shift)
```

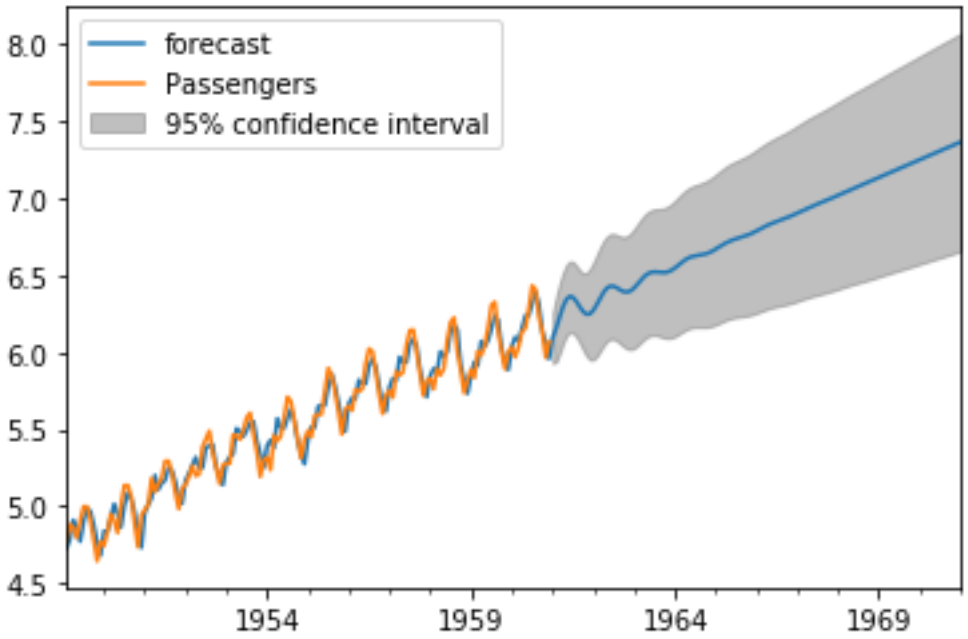


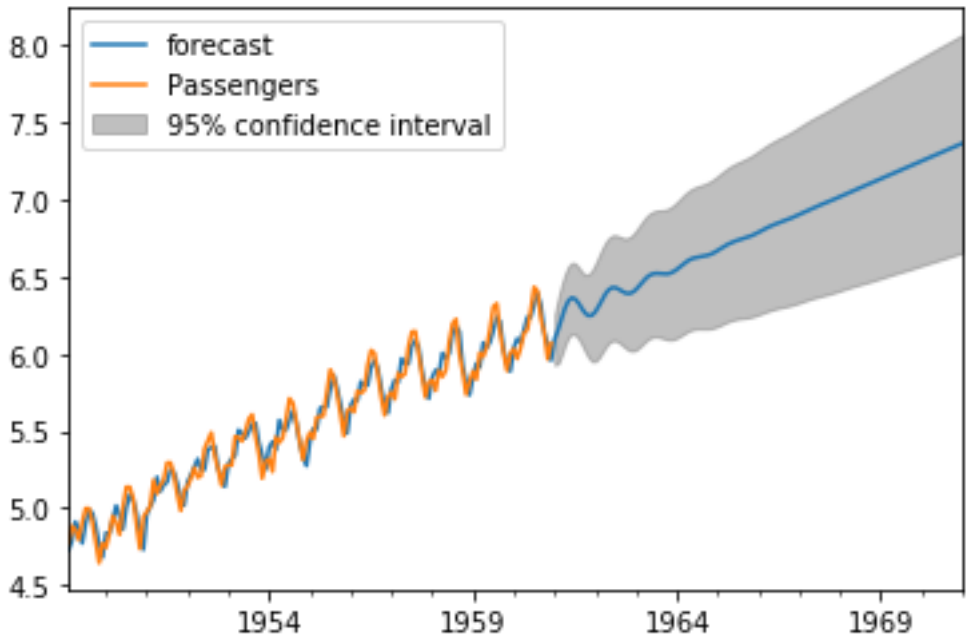

```
decomposition = seasonal_decompose(df_log)
model = ARIMA(df_log, order=(2,1,2))
results = model.fit(disp=-1)
plt.plot(df_log_shift)
plt.plot(results.fittedvalues, color='red')
```



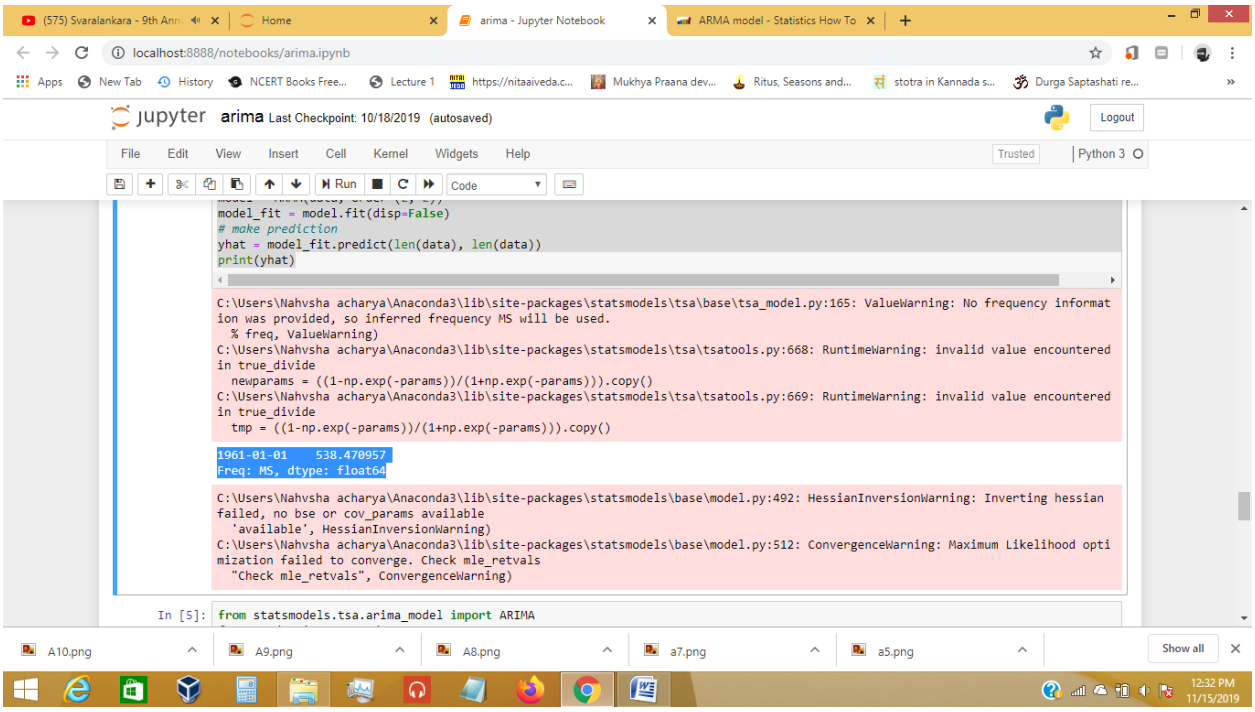
PREDICTIONS

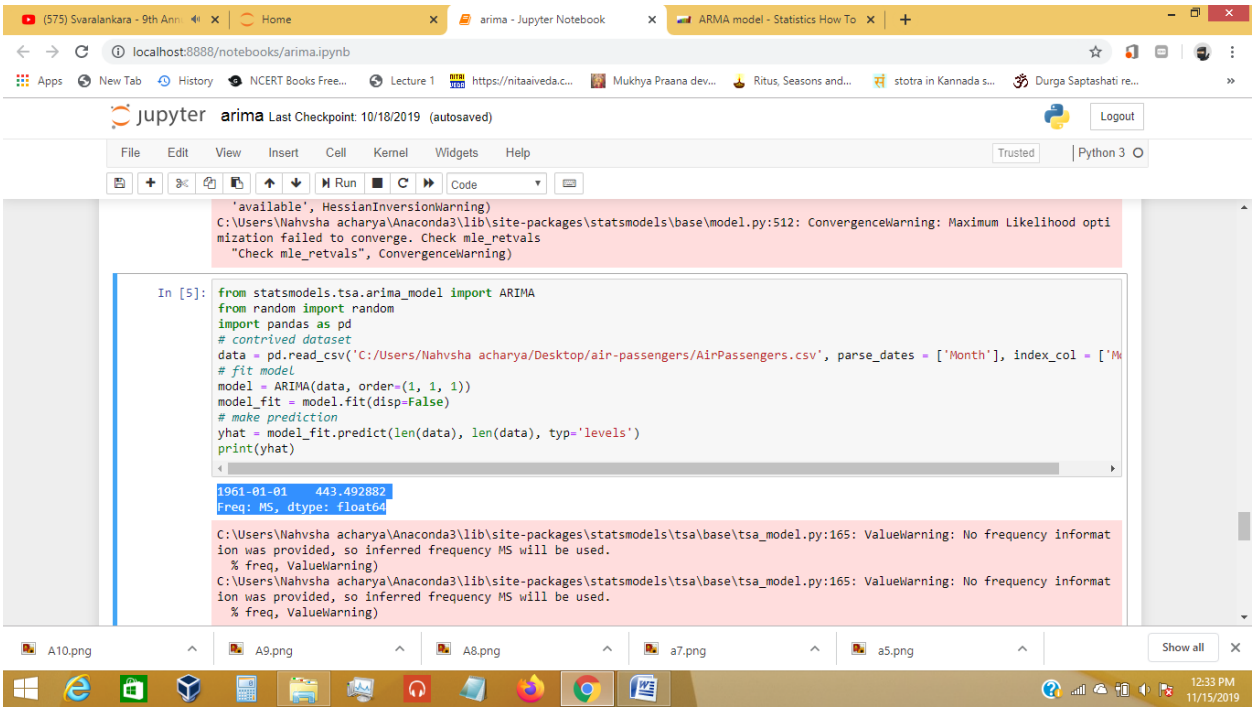

600
500
400
300
200
100
1950
1952
1954
1956
1958
1960


forecast
Passengers
95% confidence interval
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
1954
1959
1964
1969



PREDICTION FOR NEXT MONTH ARIMA AND ARMA




(575) Svaralankara - 9th Ann
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arima - Jupyter Notebook
ARMA model - Statistics How To
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jupyter arima Last Checkpoint: 10/18/2019 (autosaved)
Logout
File Edit View Insert Cell Kernel Widgets Help
Trusted
Python 3
Run
Code
'available', HessianInversionWarning)
C:\Users\Nahvsha acharya\Anaconda3\lib\site-packages\statsmodels\base\model.py:512: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals
"Check mle_retvals", ConvergenceWarning)
In [5]:
from statsmodels.tsa.arima_model import ARIMA
from random import random
import pandas as pd
# contrived dataset
data = pd.read_csv('C:/Users/Nahvsha acharya/Desktop/air-passengers/AirPassengers.csv', parse_dates = ['Month'], index_col = ['M
# fit model
model = ARIMA(data, order=(1, 1, 1))
model_fit = model.fit(disp=False)
# make prediction
yhat = model_fit.predict(len(data), len(data), typ='levels')
print(yhat)
1961-01-01 443.492882
Freq: MS, dtype: float64
C:\Users\Nahvsha acharya\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:165: ValueWarning: No frequency information was provided, so inferred frequency MS will be used.
% freq, ValueWarning)
C:\Users\Nahvsha acharya\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:165: ValueWarning: No frequency information was provided, so inferred frequency MS will be used.
% freq, ValueWarning)
A10.png
A9.png
A8.png
a7.png
a5.png
Show all
12:33 PM
11/15/2019