EXP : 5

DATE : 27.03.2025

IMPLEMENT PROGRAMS FOR ESTIMATING & ELIMINATING TREND IN TIME SERIES DATA- AGGREGATION, SMOOTHING

AIM:

Implement programs for estimating & eliminating trend in time series data- aggregation, smoothing

PROCEDURE:

STEP 1: CREATE SAMPLE DATA

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from statsmodels.tsa.api import ExponentialSmoothing
```

STEP 2: TREND ESTIMATION METHODS

```
file_path = '/content/LBMA-SILVER.csv'
df = pd.read_csv(file_path, parse_dates=['Date'], index_col='Date')
df = df.sort_index()
df = df.sort_index()
df.plot(title='Original Time Series', figsize=(15,5))
plt.show()
```

STEP 3: DETRENDING (REMOVE TREND)

```
df_monthly = df.resample('M').mean()
df_monthly.plot(title='Monthly Aggregated Time Series', figsize=(10,5))
plt.show()
```

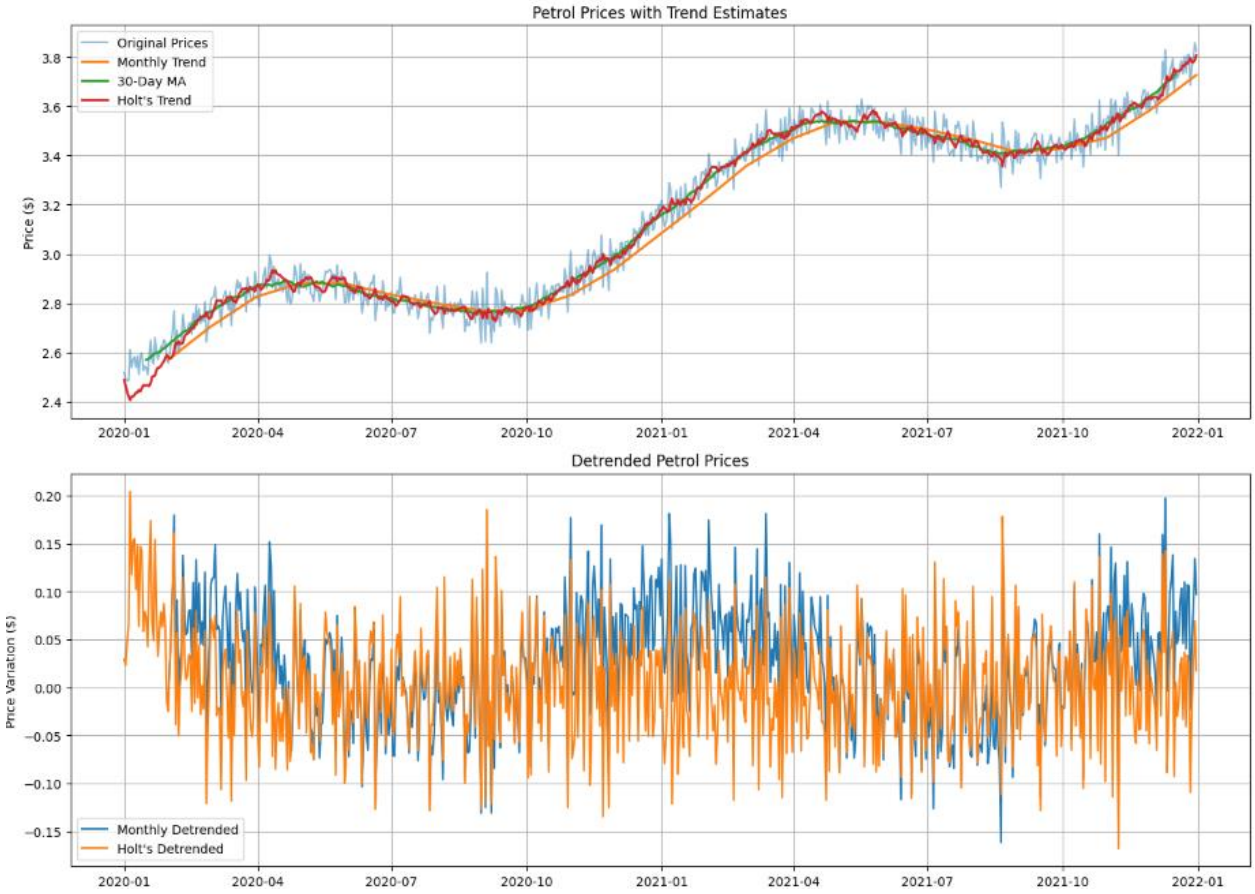
STEP 4: PLOT RESULTS

```
window_size = 10
df['Moving_Avg'] = df.iloc[:, 0].rolling(window=window_size).mean()
df[['Moving_Avg']].plot(title='Moving Average Smoothing', figsize=(20,5))
plt.show()
```

STEP 5: SAVE RESULTS (OPTIONAL)

```
window_size = 10
df['Moving_Avg'] = df.iloc[:, 0].rolling(window=window_size).mean()
df[['Moving_Avg']].plot(title='Moving Average Smoothing', figsize=(20,5))
print(df.head())
```

OUTPUTS:



RESULT:

The program to execute estimating & eliminating trend in time series data- aggregation, smoothing has been executed successfully.