

3. Implement programs to check stationary of a time series data.

EX.N0 : 3	Implement programs to check stationary of a time series data.
<u>DATE : 18/02/2025</u>	

AIM:

Implement programs to check stationary of a time series data.

PROGRAM:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from statsmodels.tsa.stattools import adfuller

# Load the dataset
file_path = "D:/Downloads/climate_change_data.csv" # Change this to your actual file path
df = pd.read_csv(file_path)

# Convert 'Date' to datetime format and set as index
df['Date'] = pd.to_datetime(df['Date'], errors='coerce')
df.set_index('Date', inplace=True)

# Selecting one column to visualize stationarity (Temperature)
series = df["Temperature"].dropna()

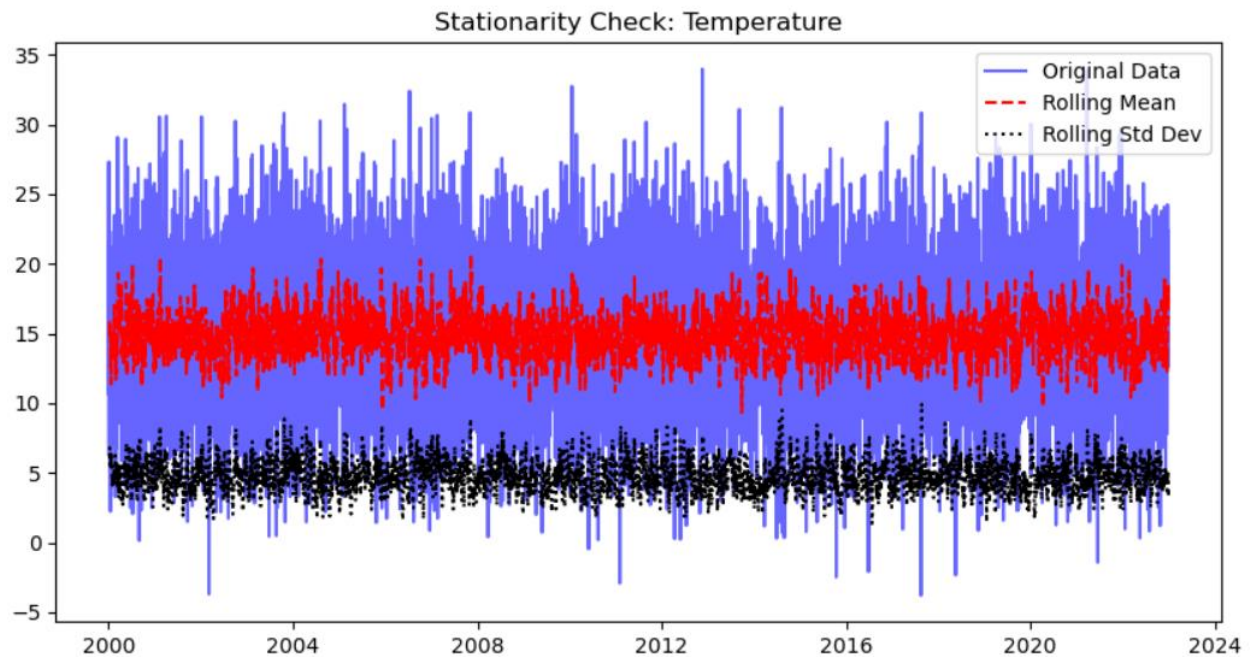
# Calculate rolling statistics
rolling_mean = series.rolling(window=10).mean()
rolling_std = series.rolling(window=10).std()

# Plot the rolling mean & standard deviation
plt.figure(figsize=(10, 5))
plt.plot(series, label='Original Data', color='blue', alpha=0.6)
plt.plot(rolling_mean, color='red', label='Rolling Mean', linestyle="dashed")
plt.plot(rolling_std, color='black', label='Rolling Std Dev', linestyle="dotted")
plt.legend()
plt.title('Stationarity Check: Temperature')
plt.show()

# Augmented Dickey-Fuller (ADF) Test
adf_test = adfuller(series)
print("### Augmented Dickey-Fuller (ADF) Test Results ###")
print(f"Test Statistic: {adf_test[0]}")
print(f"P-Value: {adf_test[1]}")
print("Critical Values:", adf_test[4])
```

```
# Interpret Results
if adf_test[1] < 0.05:
    print("The series is STATIONARY (reject H0).")
else:
    print("The series is NON-STATIONARY (fail to reject H0).")
```

OUTPUT:



```
### Augmented Dickey-Fuller (ADF) Test Results ###
Test Statistic: -100.8747218699519
P-Value: 0.0
Critical Values: {'1%': -3.4310041633725734, '5%': -2.861829101294412, '10%': -2.566923883481157}
The series is STATIONARY (reject H0).
```

RESULT:

Thus, the program for Implement programs for Implement programs to check stationary of a time series data is executed successfully.