#### **AMBOMO TIGA GEDEON 21T2496**

## **DEVOIR INF312: SERIE TEMPORELLE**

#### 1- Étude production de bière

```
In []: import numpy as np
    import matplotlib.pyplot as plt
    import pandas as pd

filepath_1 = "dataset/monthly-beer-production-in-austr.csv"
    df = pd.read_csv(filepath_1, nrows=500)
```

# 2- Moyenne, Variance et Ecart-type

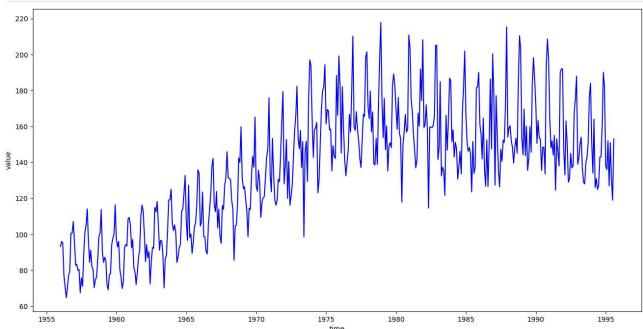
```
In [ ]: mean_1 = df['Monthly beer production'].mean()
    var_1 = df['Monthly beer production'].var()
    ect_1 = df['Monthly beer production'].std()
    print(f"moyenne: {mean_1}\nVarieance: {var_1}\nEcart-type: {ect_1}")

moyenne: 136.3953781512605
Varieance: 1138.3015364882797
Ecart-type: 33.738724583011134
```

### 3- Représentation

```
In []: plt.figure(figsize=(16,8))
    plt.plot(pd.to_datetime(df['Month']), df['Monthly beer production'], c='b')
    plt.xlabel("time")
    plt.ylabel("value")

# plt.title("Temporal serie for prooduction")
plt.show()
```

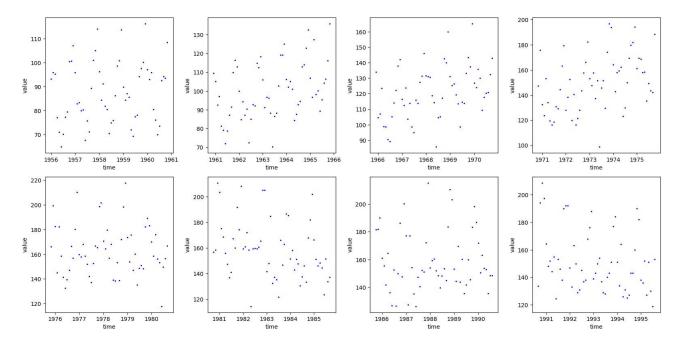


# 4- Nuage de points

```
In []: fig_1, axs_1 = plt.subplots(2, 4, figsize=(16, 8))

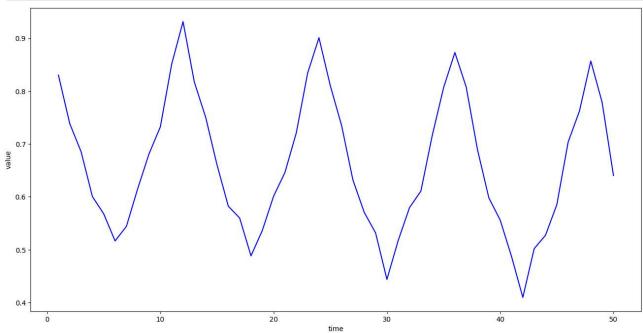
for i, ax in enumerate(axs_1.flat):
    start_idx = i * len(df['Month'])//8
    end_idx = (i+1)*len(df['Month'])//8
    ax.scatter(pd.to_datetime(df['Month'])/start_idx:end_idx]), df['Monthly beer production'][start_idx:end_idx], s=2, c='b', label="Production serie")
    ax.set_xlabel("time")
    ax.set_ylabel("value")

plt.tight_layout()
plt.show()
```



### 5- Auto-correlations

```
In []: autocorr = [df['Monthly beer production'].autocorr(lag=lag) for lag in range(1, 51)]
lags = range(1, 51)
plt.figure(figsize=(16, 8))
plt.plot(lags, autocorr, c='b', label="Production series")
plt.xlabel("time")
plt.xlabel("value")
# ptt.ttite("Temporal serie for prooduction")
plt.show()
```



# 1- <u>Étude Bitcoin</u>

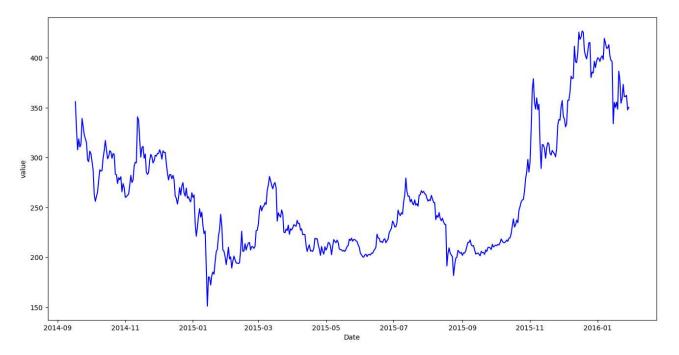
# 2- Moyenne, variance et Ecart-type

```
In []: mean_2 = df_2['Close'].mean()
    var_2 = df_2['Close'].var()
    ect_2 = df_2['Close'].std()
    print(f"moyenne: {mean_2}\nVarieance: {var_2}\nEcart-type: {ect_2}")

    moyenne: 263.36964148
    Varieance: 3671.2576510383046
    Ecart-type: 60.59090402889121
```

#### 3- Représentation

```
In [ ]: plt.figure(figsize=(16,8))
    plt.plot(pd.to_datetime(df_2['Date']), df_2['Close'], c='b');
    plt.xlabel("Date")
    plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
plt.show()
```



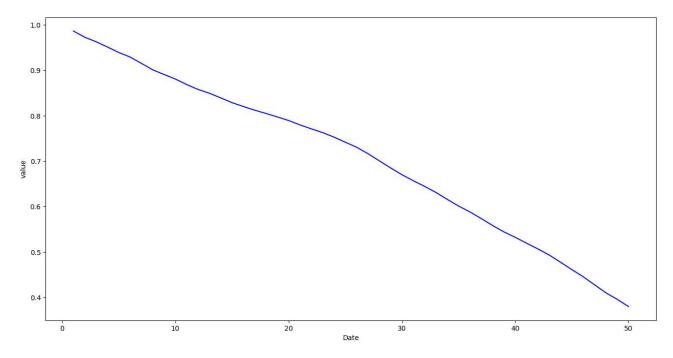
## 4- <u>Nuage de points</u>

```
In [ ]: fig_2, axs_2 = plt.subplots(4, 2, figsize=(19, 12))
            for i, ax in enumerate(axs 2.flat):
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start_idx = i*len(df_2['Date'])//8
end_idx = (i+1)*len(df_2['Date'])//8
ax.scatter(pd.to_datetime(df_2['Date'][start_idx:end_idx]), df_2['Close'][start_idx:end_idx], s=2, c='b')
           ax.set_xlabel("Date")
ax.set_ylabel("value")
# plt.title("Temporal serie for prooduction")
           plt.tight_layout()
plt.show()
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```

#### 5- Auto-correlation

```
In []: autocorr = [df_2['Close'].autocorr(lag=lag) for lag in range(1, 51)]
    lags = range(1, 51)
    plt.figure(figsize=16, 8))
    plt.plot(lags, autocorr, c='b')
    plt.xlabel("Date")
    plt.xlabel("Value")
    # plt.title("Temporal serie for prooduction")
    plt.show()
```



## 1- <u>Étude météo</u>

```
In [ ]: filepath_3 = "dataset/weather_data_kolkata_2015_2020.csv"
    df_3 = pd.read_csv(filepath_3, nrows=700);
```

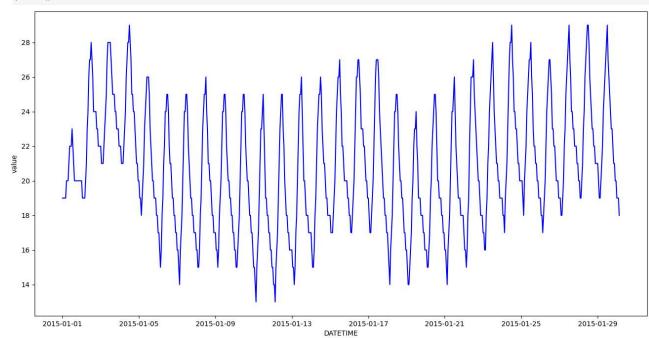
#### 2- Moyenne, variance et Ecart-type

```
In []: mean_3 = df_3['TEMPERATURE'].mean()
    var_3 = df_3['TEMPERATURE'].var()
    ect_3 = df_3['TEMPERATURE'].std()
    print(f"moyenne: {mean_3}\nVarieance: {var_3}\nEcart-type: {ect_3}")

moyenne: 20.87857142857143
Varieance: 12.524575924790518
Ecart-type: 3.5390077599223373
```

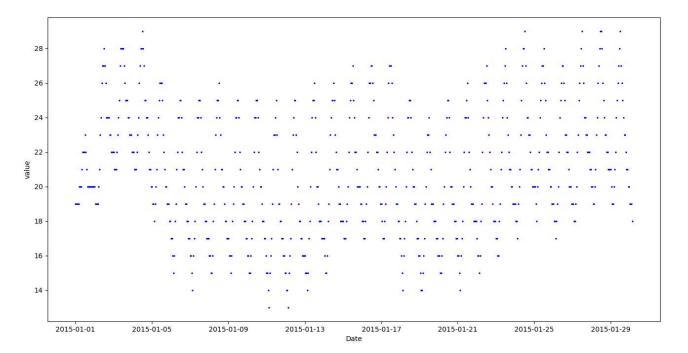
# 3- Représentation

```
In []: plt.figure(figsize=(16, 8))
    plt.plot(pd.to_datetime(df_3['DATETIME']), df_3['TEMPERATURE'], c='b');
    plt.xlabel("DATETIME")
    plt.ylabel("value")
    # plt.title("Temporal serie for prooduction")
    plt.show()
```



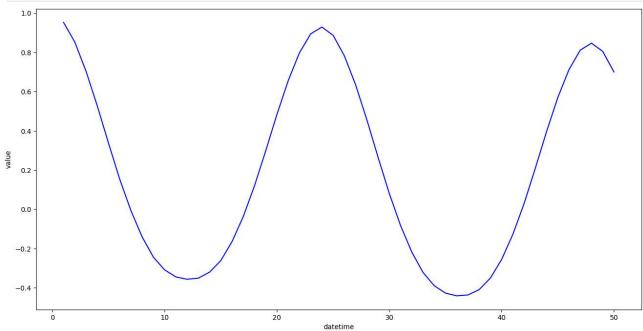
# 4- <u>Nuage de points</u>

```
In []: plt.figure(figsize=(16,8));
  plt.scatter(pd.to_datetime(df_3['DATETIME']), df_3['TEMPERATURE'], s=2, c='b')
  plt.xlabel("Date")
  plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
  plt.show()
```



#### 5- Auto-correlation

```
In []: autocorr = [df_3['TEMPERATURE'].autocorr(lag=lag) for lag in range(1, 51)]
    lags = range(1, 51)
    plt.figure(figsize=(16, 8))
    plt.plot(lags, autocorr, c='b')
    plt.xlabel("datetime")
    plt.ylabel("value")
    # plt.title("Temporal serie for prooduction")
    plt.show()
```



# 1- Étude vente panneau solaire

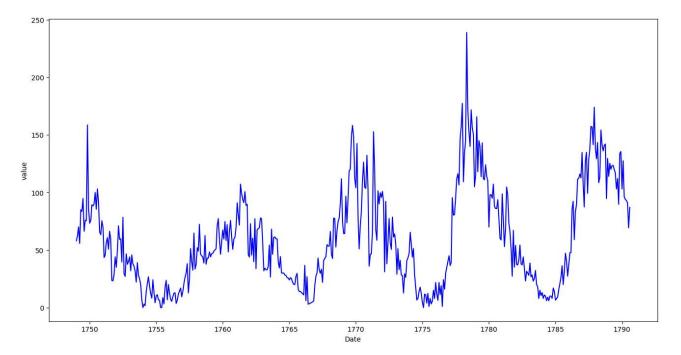
#### 2- Moyenne, variance et Ecart-type

```
In [ ]: mean_4 = df_4['Sunspots'].mean()
    var_4 = df_4['Sunspots'].var()
    ect_4 = df_4['Sunspots'].std()
    print(f*moyenne: (mean_4)\nVarieance: {var_4}\nEcart-type: {ect_4}")
    movenne: 59.60319999999994
```

moyenne: 59.60319999999994 Varieance: 1808.524959679359 Ecart-type: 42.526755809482566

#### 3- Représentation

```
In [ ]: plt.figure(figsize=(16,8))
    plt.plot(pd.to_datetime(df_4['Date']), df_4['Sunspots'], c='b')
    plt.xlabel("Date")
    plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
    plt.show()
```

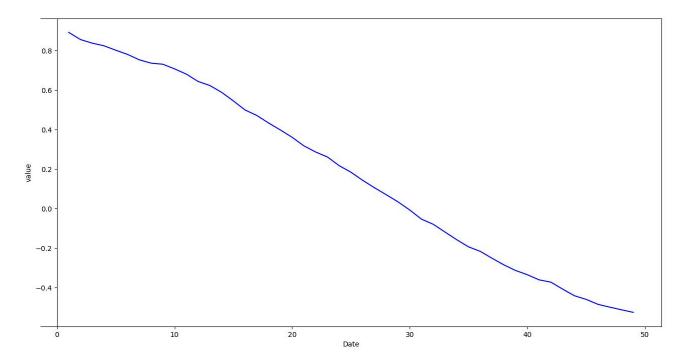


# 4- Nuage de points

```
In [ ]: fig_4, axs_4 = plt.subplots(2, 4, figsize=(16, 8))
            for i, ax in enumerate(axs_4.flat):
    start_idx = i * len(df_4['Date'])//8
    end_idx = (i+1)*len(df_4['Date'])//8
    end_idx = (i+1)*len(df_4['Date'])/8
    ax.scatter(pd.to_datetime(df_4['Date'][start_idx:end_idx]), df_4['Sunspots'][start_idx:end_idx], s=1, c='b')
    ax.set_xlabel("Date")
    ax.set_ylabel("value")
# ptt.title("Temporal serie for prooduction")
plt.tight_layout()
plt.show()
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```

# 5- Auto-correlation

```
In []: fig, ax = plt.subplots(figsize=(16, 8))
    autocorr = [df_4['Sunspots'].autocorr(lag=lag) for lag in range(1, 50)]
    lags = range(1, 50)
    ax.plot(lags, autocorr, ce'b')
    ax.spines['left'].set_position('zero')
    plt.xlabel("Date")
    plt.ylabel("Value")
    # plt.title("Temporal serie for prooduction")
    plt.show()
```



### 1- Étude production électrique

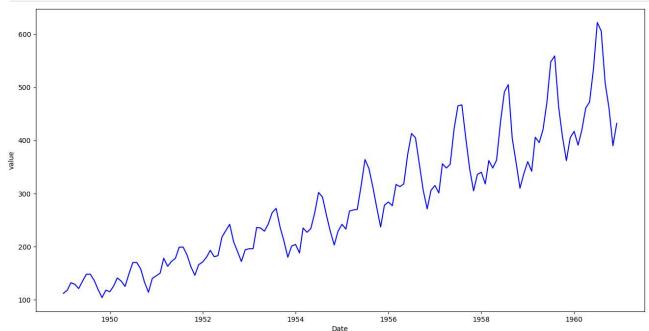
# 2- Moyenne, variance et Ecart-type

```
In []: mean_5 = df_5['Airpass'].mean()
    var_5 = df_5['Airpass'].var()
    ect_5 = df_5['Airpass'].std()
    print(f"moyenne: {war_5}\nVarieance: {var_5}\nEcart-type: {ect_5}")

moyenne: 280.298611111111
Varieance: 14391.917208547
Ecart-type: 119.9663169429432
```

#### 3- Représentation

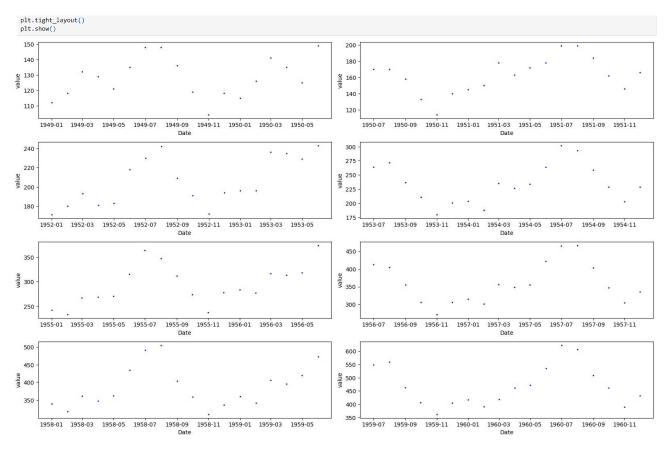
```
In []: plt.figure(figsize=(16, 8))
    plt.plot(pd.to_datetime(df_5['t']), df_5['Airpass'], c='b')
    plt.xlabel("Date")
    plt.ylabel("value")
    # plt.title("Temporal serie for prooduction")
    plt.show()
```



## 4- Nuage de points

```
In []: fig_5, axs_5 = plt.subplots(4, 2, figsize=(16, 10))

for i, ax in enumerate(axs_5.flat):
    start_idx = i * len(df_5['t'])//8
    end_idx = (i+1)*len(df_5['t'])//8
    ax.scatter(pd_t.o_datetime(df_5['t'])//8
    ax.scatter(pd_t.o_datetime(df_5['t'][start_idx:end_idx]), df_5['Airpass'][start_idx:end_idx], s=2, c='b')
    ax.set_xlabel("Date")
    ax.set_ylabel("value")
```



### 5- Auto-correlation

```
In []: autocorr = [df_5['Airpass'].autocorr(lag-lag) for lag in range(1, 50)]
lags = range(1, 50)
plt. figure(figs)zec(16, 8))
plt. slabel('Taue')
```

Date