**EX:No.3 LINEAR REGRESSION 221501016 21/01/25**

**AIM :** To implement linear regression on a time series data .

**IMPLEMENTATION :**

import pandas as pd

from sklearn.model\_selection import train\_test\_split

from sklearn.linear\_model import LinearRegression

import matplotlib.pyplot as plt

**Load the dataset**

file\_path = "Electric\_Production.csv"

df = pd.read\_csv(file\_path)

**Convert DATE to a numerical format**

df["DATE"] = pd.to\_datetime(df["DATE"])

df["DATE\_ORDINAL"] = df["DATE"].map(pd.Timestamp.toordinal)

**Define features (X) and target variable (Y)**

X = df[["DATE\_ORDINAL"]]

y = df["IPG2211A2N"]

**Split data into training and testing sets**

X\_train, X\_test, y\_train, y\_test = train\_test\_split(X, y, test\_size=0.2, random\_state=42)

**Train the linear regression model**

model = LinearRegression()

model.fit(X\_train, y\_train)

**Model coefficients**

print(f"Slope: {model.coef\_[0]}")

print(f"Intercept: {model.intercept\_}")

**Make predictions**

y\_pred = model.predict(X\_test)

**Plot the regression line**

plt.scatter(X\_test, y\_test, color='blue', label='Actual Data')

plt.plot(X\_test, y\_pred, color='red', linewidth=2, label='Regression Line')

plt.xlabel("Date (Ordinal)")

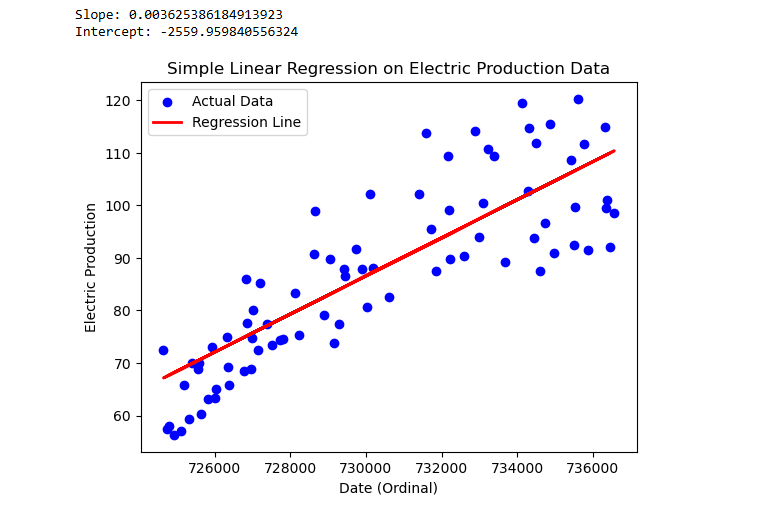
plt.ylabel("Electric Production")

plt.title("Simple Linear Regression on Electric Production Data")

plt.legend()

plt.show()

**OUTPUT:**

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**RESULT :** Thus linear regression has been implemented on a time series data.