

Command	Explanation	Notes
sb.regplot()	Plots regression line	import seaborn as sb
ss.pearsonr()	Calculates and tests correlation	import scipy.stats as ss
smf.ols()	runs OLS regression	import statsmodels.formula.api as smf
ols.summary()	summarizes regression ols	import statsmodels.formula.api as smf
ols.resid	residuals of ols	import statsmodels.formula.api as smf
ols.fittedvalues	fitted values of ols	import statsmodels.formula.api as smf
ols.conf_int()	confidence interval of ols	import statsmodels.formula.api as smf
ols.predict()	predictions using ols	import statsmodels.formula.api as smf

I plot some data and its regression line; test $H_0 : \rho_{xy} = 0$ against $H_a : \rho_{xy} \neq 0$; show regression results, fitted values, residuals, and the 99 percent confidence intervals for β_1 and β_2 ; and calculate fitted value when $x = 5$.

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1  # Read in data
2  import pandas as pd
3  df = pd.read_csv(r'https://www.wimivo.com/data.csv')
4
5  # Scatter plot of the data will show at the end of script
6  import matplotlib.pyplot as plt
7  import seaborn as sb
8  plt.title("Scatter Plot and Regression Line")
9  plt.xlabel("var1")
10 plt.ylabel("var2")
11 sb.regplot(x='var1', y='var2', ci=None, data=df)
12
13 # Calculate correlation, test if it's different than zero
14 import scipy.stats as ss
15 corr, pVal = ss.pearsonr(df['var1'], df['var2'])
16 print(corr, pVal)
17
18 # Regress var2 on var1
19 import statsmodels.formula.api as smf
20 ols = smf.ols('var2 ~ var1', data=df).fit()
21 print(ols.summary())
22
23 # Show residuals and fitted values
24 olsValues = pd.DataFrame(zip(ols.resid, ols.fittedvalues),
25                           columns=['residuals', 'fitted values'])
26 print(olsValues)
27
28 # Show 99 percent confidence interval of regression coefficients
29 confInf = ols.conf_int(alpha=0.01)
30 print(confInf)
31
32 # Predicts var2 value when var1 = 5
33 xPred = pd.DataFrame([5], columns=['var1'])
34 yPred = ols.predict(xPred)
35 print(yPred)
36
37 # Show the scatter plot drawn earlier
38 plt.show()

```