In [1]:

```
import xlrd
import xlwt
import numpy as np
import matplotlib.pyplot as plt
# %matplotlib inline
import neurolab as nl
import pandas as pd
import seaborn as sns
import os
from sklearn.linear_model import LinearRegression
from sklearn.metrics import r2_score
import time

data = pd.read_excel('data1.xlsx')

names = data.columns



data.drop_duplicates(inplace=True)  # removing duplicates

data.dropna()


limit = {}


def IQR_outlier(dt, name):
    q1 = dt.quantile(.25)
    q3 = dt.quantile(.75)
    iqr = q3 - q1
    l_limit = q1 - 1.5 * iqr
    r_limit = q3 + 1.5 * iqr
    l_limit = round(l_limit, 2)
    r_limit = round(r_limit, 2)
    limit[name] = [l_limit, r_limit]


def removal_outlier(st, name):
    st = st[st < limit[name][1]]
    st = st[st > limit[name][0]]
    return st

import statsmodels.api as sm
X = data[['SO2','NOX','BENZENE']]
y = data['PM10']
X = sm.add_constant(X)
model11 = sm.OLS(y, X).fit()
print(model11.summary())
```

OLS Regression Results

```
==============================================================================
Dep. Variable:                   PM10   R-squared:                       0.769
Model:                            OLS   Adj. R-squared:                  0.743
Method:                 Least Squares   F-statistic:                     29.96
Date:                Sat, 08 Dec 2018   Prob (F-statistic):           9.69e-09
Time:                        11:25:07   Log-Likelihood:                -170.73
No. Observations:                  31   AIC:                             349.5
Df Residuals:                      27   BIC:                             355.2
Df Model:                           3
Covariance Type:            nonrobust
==============================================================================
                 coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
const         -9.2848     61.089     -0.152      0.880    -134.629     116.059
SO2            8.4066      2.638      3.187      0.004       2.995      13.819
NOX            0.7231      0.664      1.089      0.286      -0.639       2.085
BENZENE       25.4305     10.279      2.474      0.020       4.340      46.521
==============================================================================
Omnibus:                        6.365   Durbin-Watson:                   2.119
Prob(Omnibus):                  0.041   Jarque-Bera (JB):                4.642
Skew:                           0.819   Prob(JB):                       0.0982
Kurtosis:                       3.954   Cond. No.                         418.
==============================================================================

Warnings:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
```