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#!/usr/bin/env python
# coding: utf-8

# In[1]:

import numpy as np
import pandas as pd

# In[5]:

cd ..

# In[7]:

pd.read_csv('BWGHT.csv')
df = pd.read_csv('BWGHT.csv')

# In[8]:

x = df[['cigs', 'faminc']]
y = df['bwght']
pd.concat([y,x],axis=1)

# In[14]:

df['(intercept)'] = 1
x = df[['(intercept)', 'cigs', 'faminc']]
y = df['bwght']
b = np.linalg.solve(x.T@x, x.T@y)
e = y-x@b
vb = e.var()*np.linalg.inv(x.T@x)
se = np.sqrt(np.diagonal(vb))
tstat = b/se

# In[21]:

class linear_model:
    def __init__(self, x, y):
        self.x = x
        self.y = y
        self.b = np.linalg.solve(x.T@x, x.T@y)
        e = y-x@b
        self.vb = self.vcov_b(e)
        self.se = np.sqrt(np.diagonal(self.vb))
        self.tstat = self.b/self.se
        self.nw = self.newey_west(e)
        self.nwse = np.sqrt(np.diagonal(self.nw))
        self.nwtstat = self.b/self.nwse

    def vcov_b(self, e):
        x = self.x
        return e.var()*np.linalg.inv(x.T@x)
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def newey_west(self,e):
    s = 0
    for i in range(len(e)):
        s += e[i]*e[i]
    s = s/(len(e))

    s1 = 0
    for i in range(1,len(e)):
        s1 += e[i]*e[i-1]
    s1 = s1/(len(e))

    omega = np.zeros((len(e), len(e)), float)
    np.fill_diagonal(omega,s)
    omega[1,0]=s1
    omega[len(e)-2,len(e)-1]=s1

    for i in range(1,len(e)-1):
        omega[i-1,i]=s1
        omega[i+1,i]=s1
    print(omega)

    bread = np.linalg.inv(x.T@x)@x.T
    sandwich = bread@omega@bread.T

    return sandwich

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In[22]:

linear_model(x,y).nwse

In[]: