

# Simulation

October 26, 2021

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[1]: # -*- coding: utf-8 -*-
      """
      Created on Tue Oct 26 10:27:47 2021

      @author: Carlos
      """

      from scipy import random
      from scipy import stats
      import pandas as pd
      import numpy as np
      import statsmodels.formula.api as smf

      def simulation():
          T = 1000
          sigmax1 = 10
          sigmax2 = 10
          sigmaepsilon = 1
          beta1 = 10
          beta2 = -10

          x1 = random.normal(0,sigmax1, T)
          x2 = random.normal(0,sigmax2, T)
          epsilon1 = random.normal(0,sigmaepsilon, T)
          epsilon2 = random.normal(0,sigmaepsilon, T)

          y1 = beta1 * x1 + epsilon1
          y2 = beta2 * x2 + epsilon2

          y = y1 - y2
          x = x1 - x2

          DictFrame = {
              'y': y,
              'x': x,
              'y1': y1,
              'x1': x1,
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        'y2': y2,
        'x1': x1
    }

    Frame = pd.DataFrame.from_dict(DictFrame)
    model = smf.ols("y ~ x - 1", data=Frame).fit()
    return model

params = []
for tries in range(0,10000):
    model = simulation()
    params.append(model.params[0])

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[2]: params

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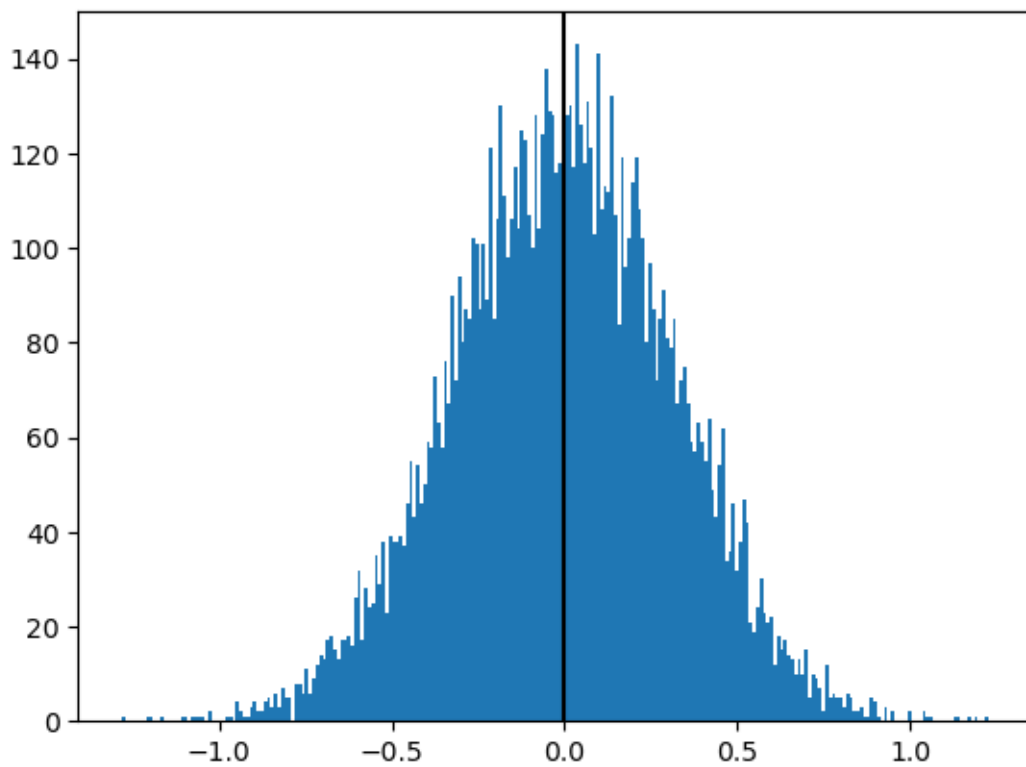
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[3]: import matplotlib.pyplot as plt
```

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fig = plt.figure()  
plt.hist(params, bins=250)  
plt.axvline(0, color='black')  
plt.show()
```



[ ]: