



source code:

import numpy

import random

import matplotlib.pyplot as plt

def generate\_sample(index):

row\_sample=[]

row\_size=10

for i in range(row\_size):

row\_random=random.random()

if row\_random<0.5:

row\_sample.append(0)

else:

row\_sample.append(1)

decimal=int("".join(str(x) for x in row\_sample),2)

row\_sample.append(decimal)

prob=0.9/1.1\*0.1\*\*abs(128-decimal)

row\_sample.append(prob)

return row\_sample

def sum\_of\_prob(data):

sum\_of\_number=0

for i in range(len(data)):

sum\_of\_number+=data[i][11]

return sum\_of\_number

total\_sample=[generate\_sample(d) for d in range(150000)]

sample\_num=list(range(1000,1000000,5000))

def diff\_number\_sample\_2(sample\_number):

sample=total\_sample[:sample\_number]

denominator=sum\_of\_prob(sample)

sample\_2=[sample[i] for i in range(len(sample)) if sample[i][8]==1 ] #sample which B2=1

numerator\_2=sum\_of\_prob(sample\_2)

result\_2=numerator\_2/denominator

return result\_2

final\_result\_2=[diff\_number\_sample\_2(d) for d in sample\_num]

print(final\_result\_2[-1])

plt.plot(sample\_num,final\_result\_2)

plt.ylabel('P(B2=1|Z=128)')

plt.show()

def diff\_number\_sample\_5(sample\_number):

sample=total\_sample[:sample\_number]

denominator=sum\_of\_prob(sample)

sample\_5=[sample[i] for i in range(len(sample)) if sample[i][5]==1 ] #sample which B5=1

numerator\_5=sum\_of\_prob(sample\_5)

result\_5=numerator\_5/denominator

return result\_5

final\_result\_5=[diff\_number\_sample\_5(d) for d in sample\_num]

print(final\_result\_5[-1])

plt.plot(sample\_num,final\_result\_5)

plt.ylabel('P(B5=1|Z=128)')

plt.show()

def diff\_number\_sample\_8(sample\_number):

sample=total\_sample[:sample\_number]

denominator=sum\_of\_prob(sample)

sample\_8=[sample[i] for i in range(len(sample)) if sample[i][2]==1 ] #sample which B8=1

numerator\_8=sum\_of\_prob(sample\_8)

result\_8=numerator\_8/denominator

return result\_8

final\_result\_8=[diff\_number\_sample\_8(d) for d in sample\_num]

print(final\_result\_8[-1])

plt.plot(sample\_num,final\_result\_8)

plt.ylabel('P(B8=1|Z=128)')

plt.show()

def diff\_number\_sample\_10(sample\_number):

sample=total\_sample[:sample\_number]

denominator=sum\_of\_prob(sample)

sample\_10=[sample[i] for i in range(len(sample)) if sample[i][0]==1 ] #sample which B10=1

numerator\_10=sum\_of\_prob(sample\_10)

result\_10=numerator\_10/denominator

return result\_10

final\_result\_10=[diff\_number\_sample\_10(d) for d in sample\_num]

print(final\_result\_10[-1])

plt.plot(sample\_num,final\_result\_10)

plt.ylabel('P(B10=1|Z=128)')

plt.show()