Monte Carlo Simulation

Lab-5

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Question 1-

(a) For the normal (N(0,1)) number generation, Marseglia and Bray method has been used.

Then we have generated X1 and X2 by :

$X1 = \mu 1 + \sigma 1Z1$ $X2 = \mu 2 + \rho \sigma 2Z1 + \sqrt{(1 - \rho 2\sigma 2Z2)}$

Where Z1 and Z2 follow N(0, 1) distribution .

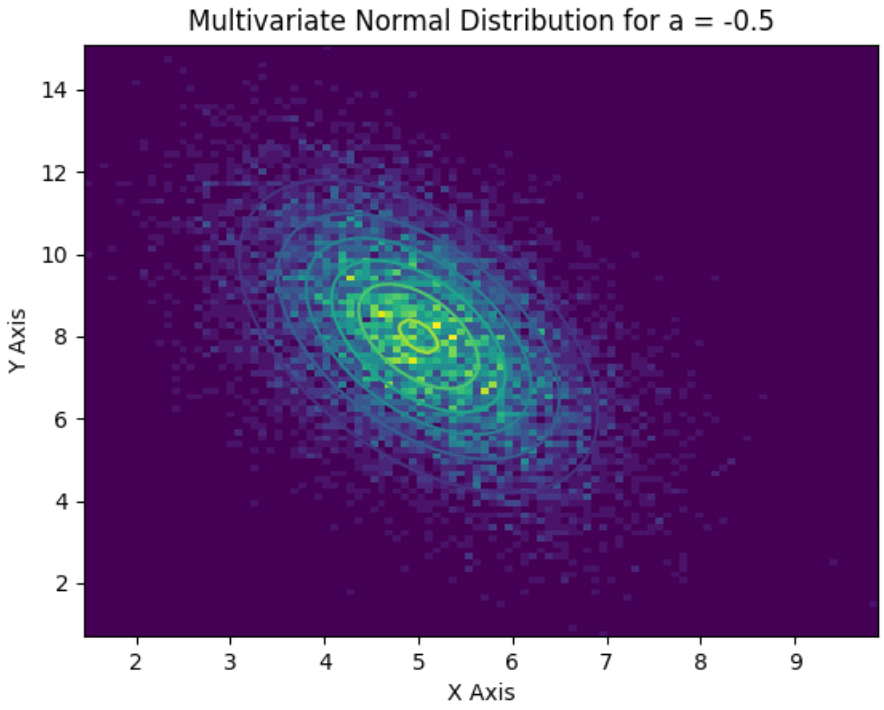
(b) The 2d histogram has been plotted with the help of python module matplotlib.

(c) Contour graphs can be plotted with the help of python module matplotlib

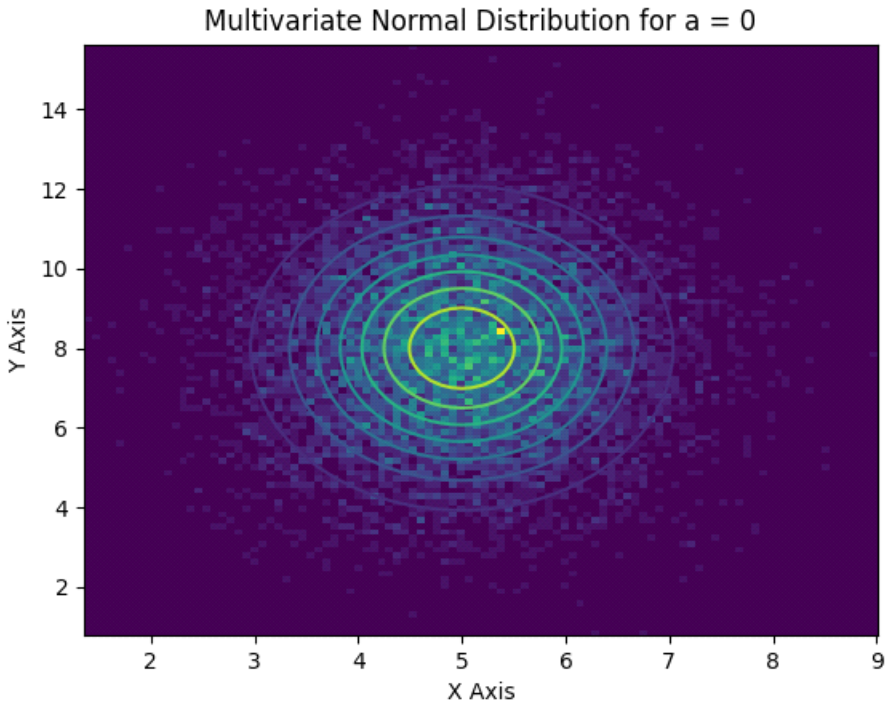
whereas scipy module is used to generate bivariate normal distribution The 2-d histograms and contour plots have been plotted on the same graph for the

following values of a:

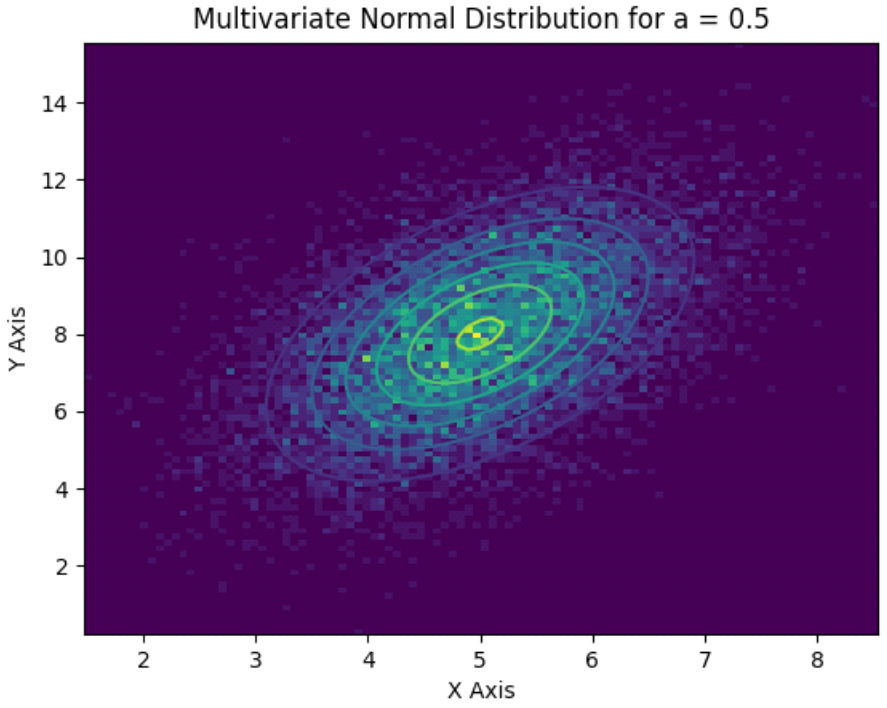
a=-0.5



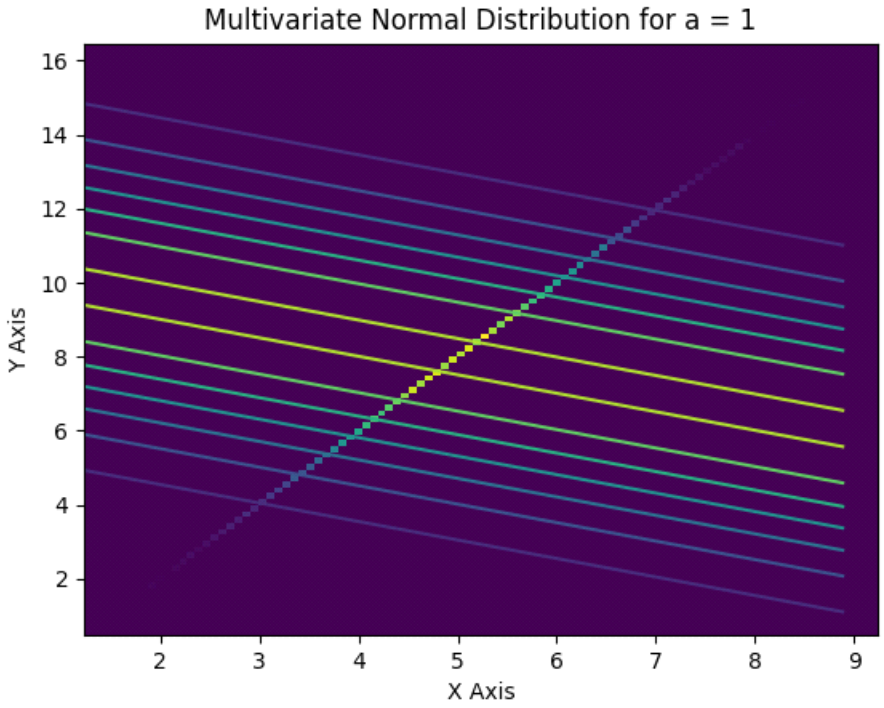
a=0


Multivariate Normal Distribution for a = 0
Y Axis
X Axis
14
12
10
8
6
4
2
2
3
4
5
6
7
8
9

a=0.5


Multivariate Normal Distribution for a = 0.5
Y Axis
X Axis
14
12
10
8
6
4
2
2
3
4
5
6
7
8

a=1


Multivariate Normal Distribution for a = 1
Y Axis
X Axis
16
14
12
10
8
6
4
2
2
3
4
5
6
7
8
9