Foundation of Data Science Assignment-2

-Group members-

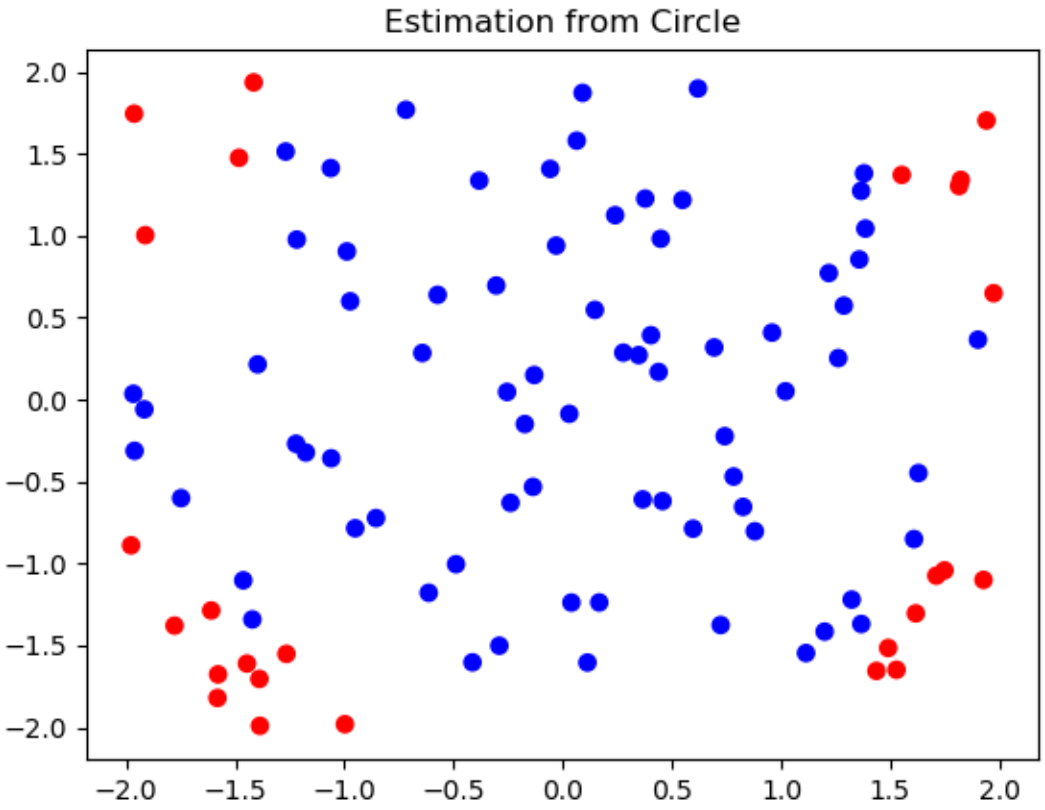
Himanshu Badlani-2015B3A70548H

Pranjal DineshChandra Gupta-2015B4A70668H

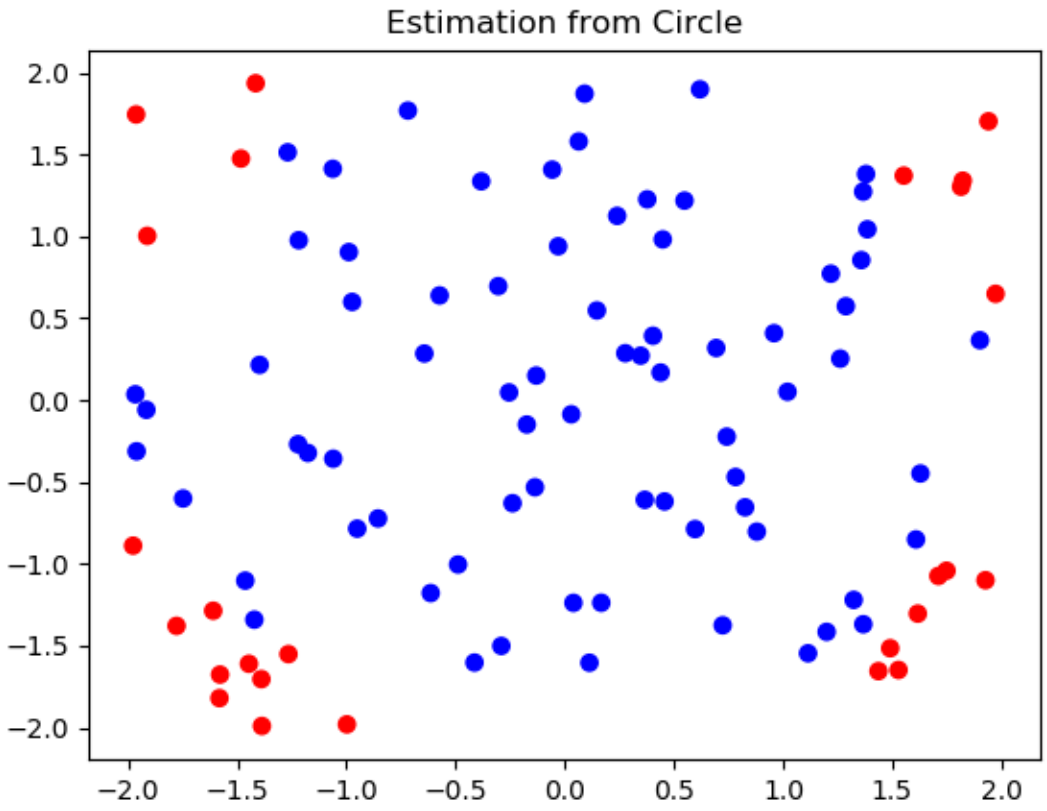
Rohan Jain-2015B4A70676H

Part A:

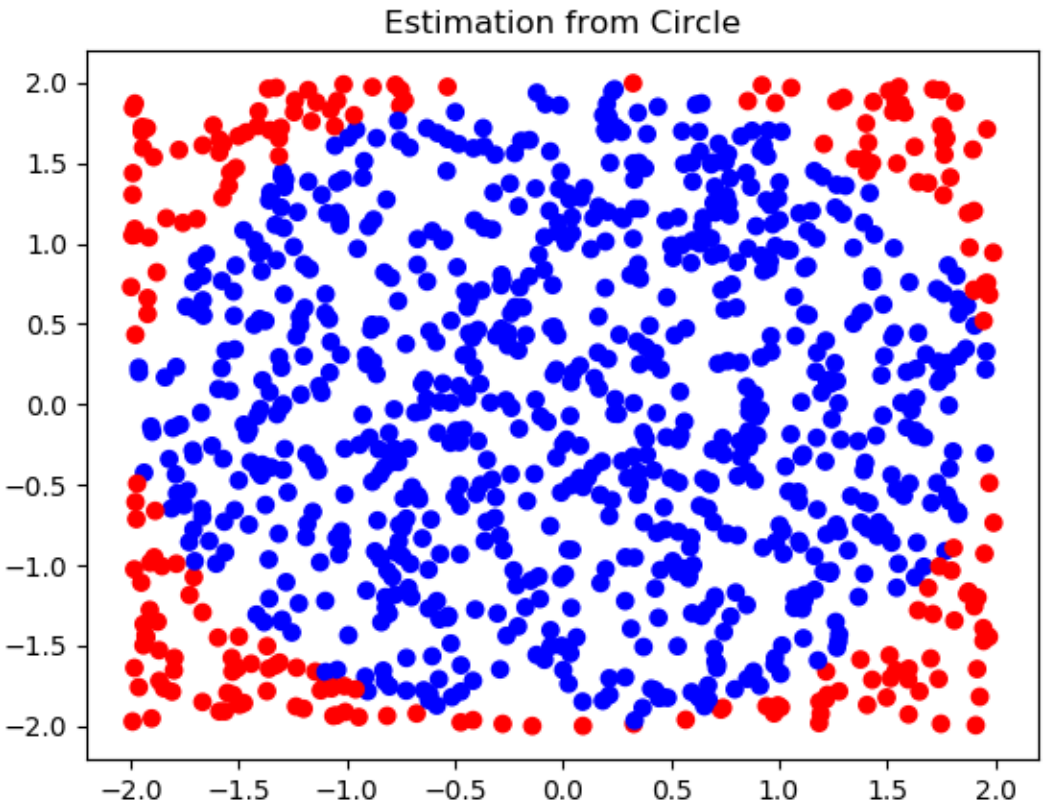
Circle Approximation



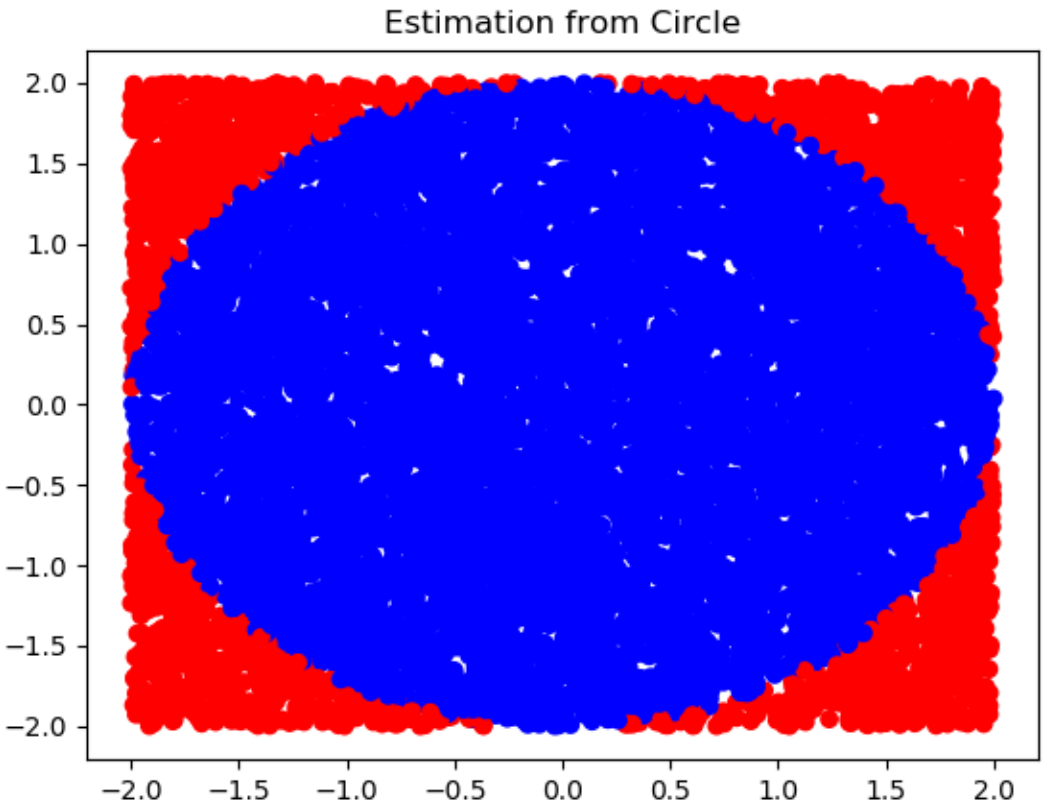
From 10


Estimation from Circle
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−2.0
−2.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0

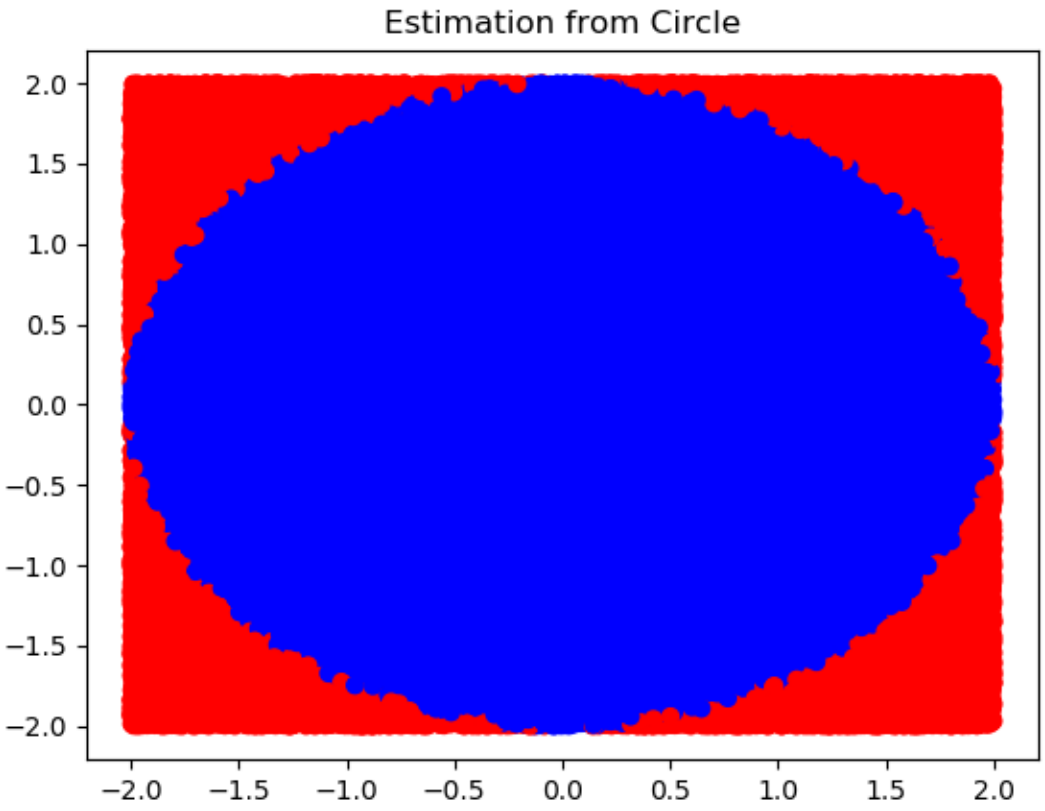
From 100


Estimation from Circle
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−2.0
−2.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0

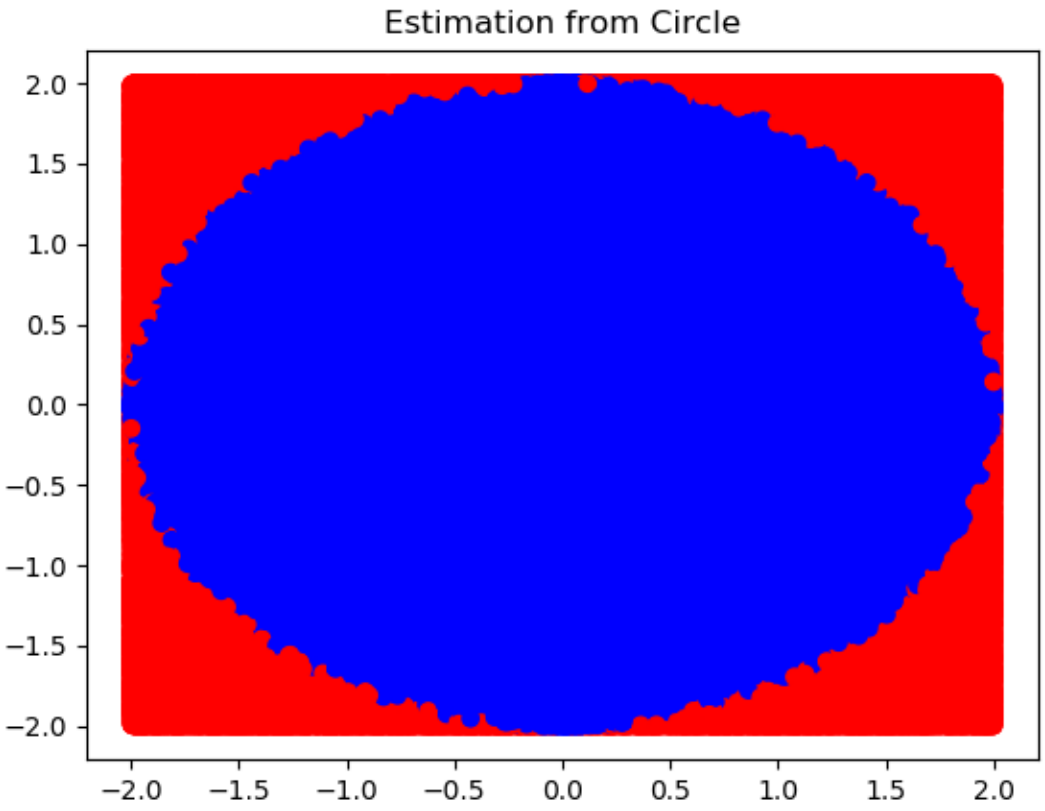
From 1000


Estimation from Circle
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−2.0
−2.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0

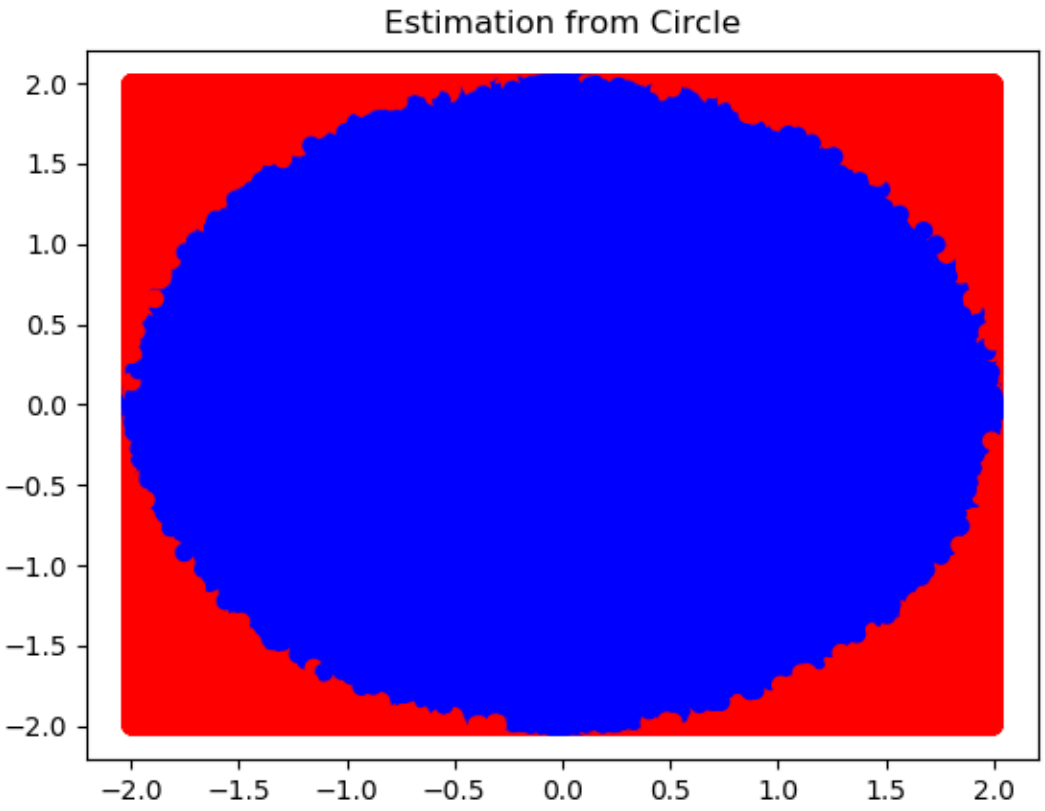
From 10000


Estimation from Circle
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−2.0
−2.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0

From 100000



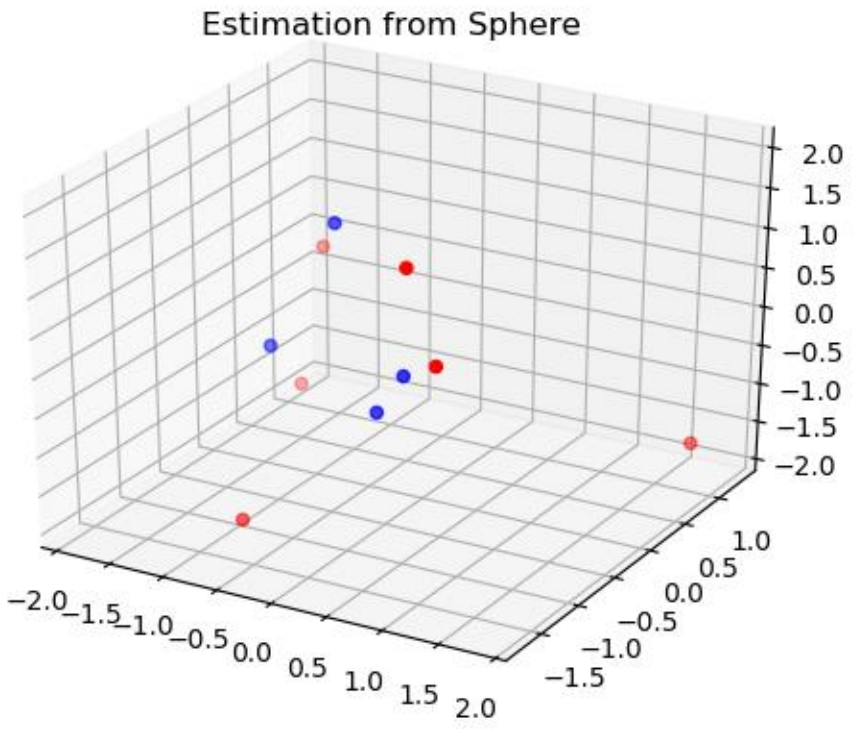
From 1000000



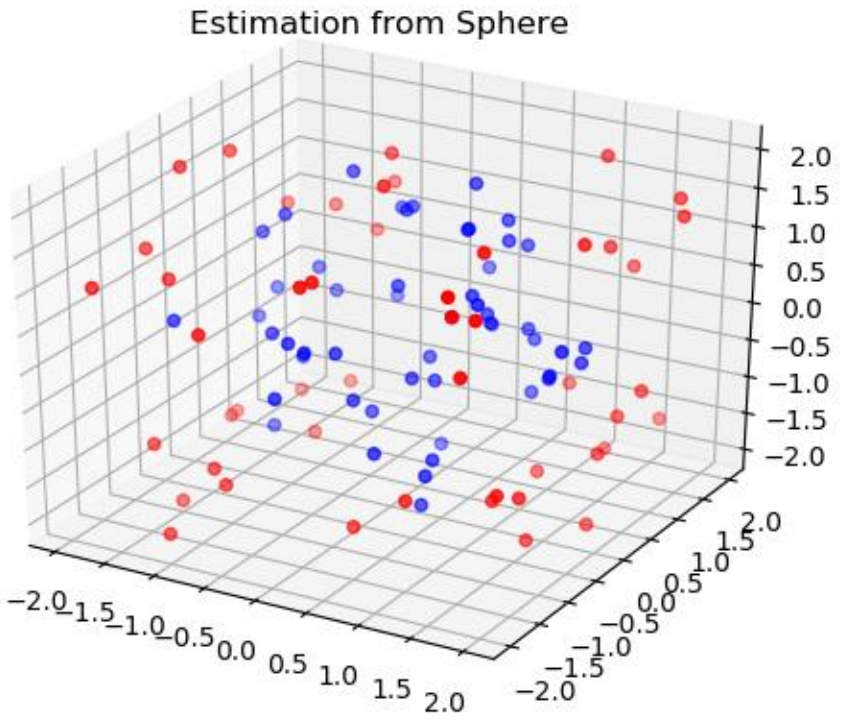
From 10000000

Part B:

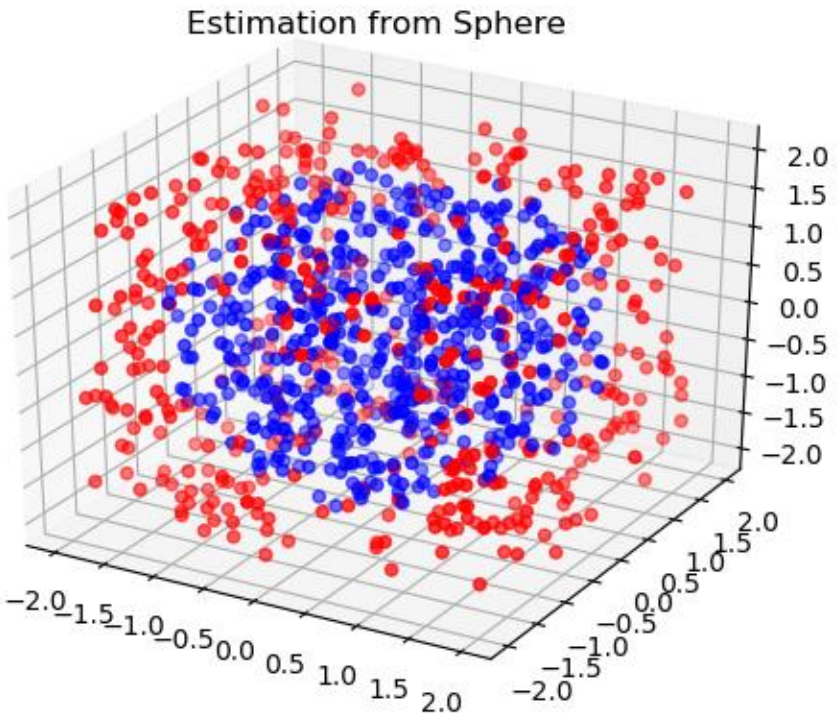
Sphere Approximation



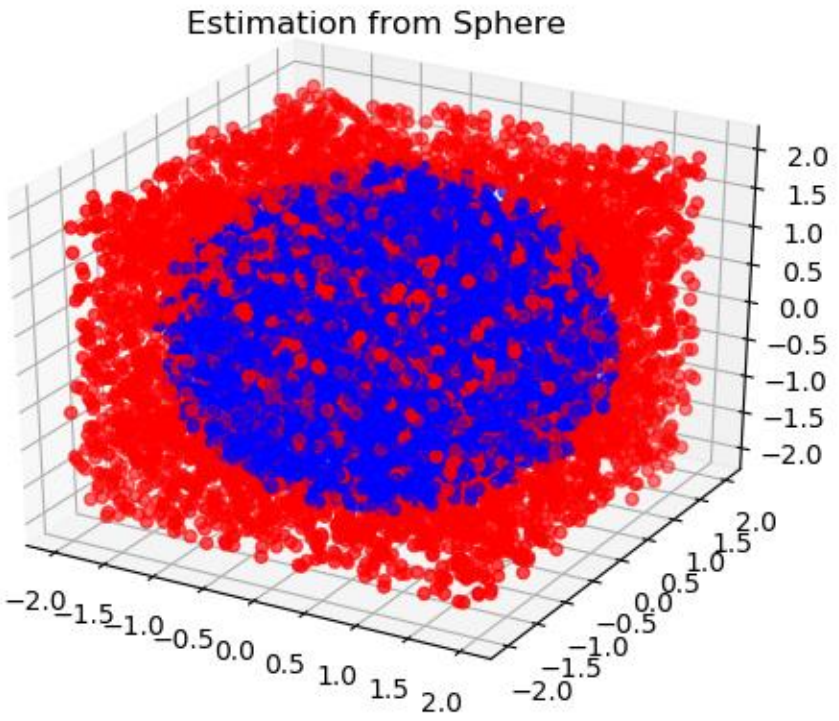
From 10


Estimation from Sphere
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−2.0
−2.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0

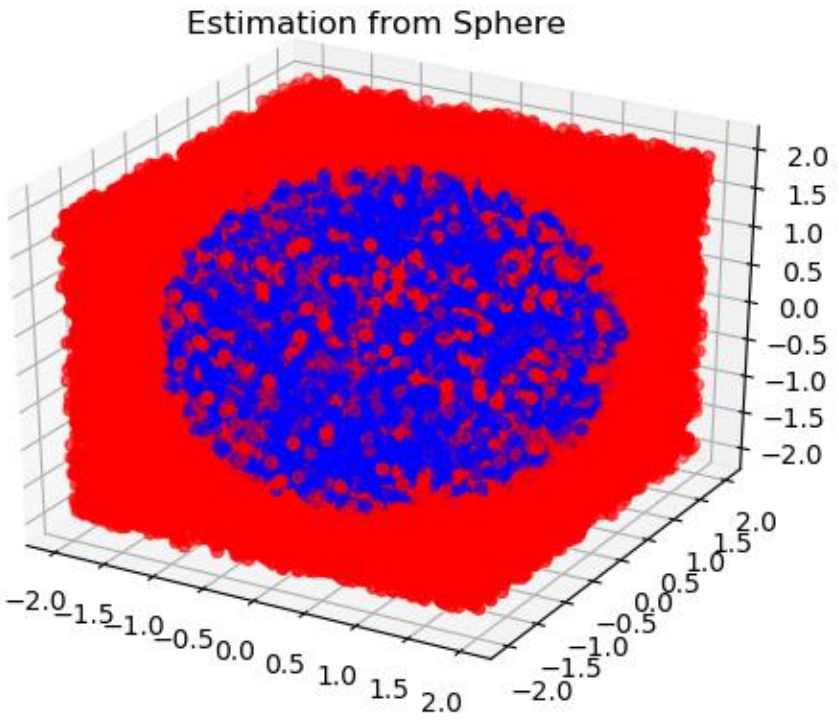
From 100


Estimation from Sphere
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−2.0
−2.0 −1.5 −1.0 −0.5 0.0 0.5 1.0 1.5 2.0
2.0 1.5 1.0 0.5 0.0 −0.5 −1.0 −1.5 −2.0

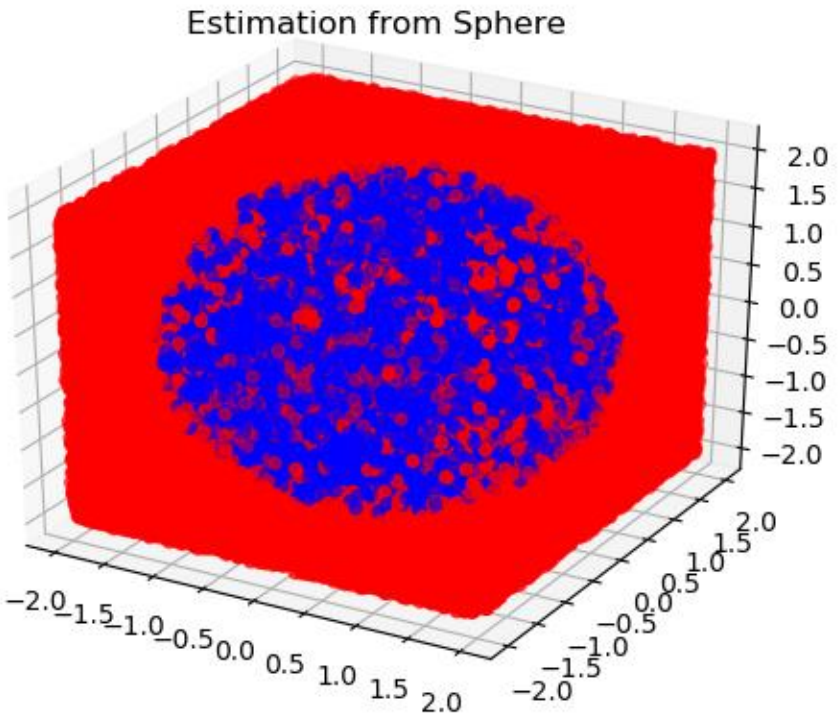
From 1000


Estimation from Sphere
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−2.0
−2.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0

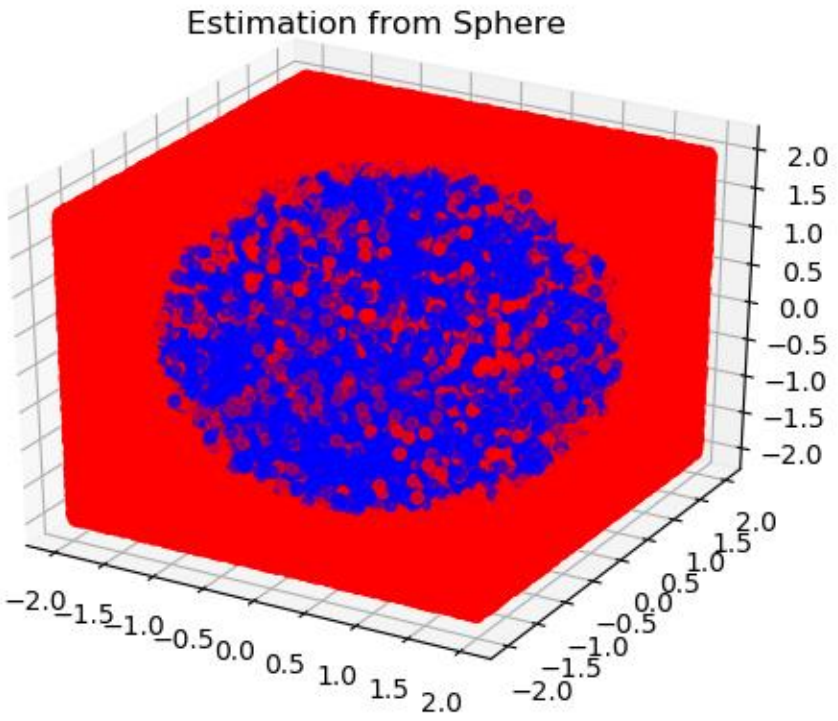
From 10000


Estimation from Sphere
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−2.0
−2.0 −1.5 −1.0 −0.5 0.0 0.5 1.0 1.5 2.0
2.0 1.5 1.0 0.5 0.0 −0.5 −1.0 −1.5 −2.0

From 100000



From 1000000



From 10000000

Part C:

Analysis

	10	100	1000	10000	100000	1000000	10000000
Circle	**3.2**	**3.32**	**3.104**	**3.1512**	**3.14272**	**3.140468**	**3.1417656**
Sphere	**3.0**	**3.42**	**3.084**	**3.1524**	**3.1437**	**3.144966**	**3.1415748**
Difference	**-0.20**	**0.10**	**-0.02**	**0.0012**	**0.000979**	**0.004498**	**-0.000190**

- The estimates get better with increase in number of points.
- For a fixed value of N, 2D approximation is better approximate than 3D approximation since 3D approximation requires more number of points than 2D approximation.
- Error of estimate is inversely proportional to $\sqrt{N}$, where N is the number of points.