Project Discussion(P342)

B Rajesh Achari

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1 Random Walk Simulation in 2D-Plane

In this problem the walk can go to any direction from 0 to 2π. Each step's direction is independent of its previous step. 5 step size(N) are taken. For each step 100 random walks are created. Average distance from origin to end of walk for each set are calculated. As average x distance and average y distance should be zero but calculated values are not exactly zero but nearly zero. The rms values of distance between origin to end point of each set of walk are calculated and plotting of R_{rms} and $\sqrt{N}$ gives a slope 1.09289, as it should be $\sim$1.0.

2 Ellipsoid Problem

This problem demonstrates how to calculate the volume of an ellipsoid using Monte-Carlo method. Here it is assumed a cuboid such that the cuboid encloses the ellipsoid. Then N numbers of random coordinates inside the cuboid are generated and checked whether the point lies inside the ellipsoid or not. The multiple of volume of cuboid to the probability of the point lies inside gives the volume of ellipsoid. As the fractional error decreases significantly with increasing the number of points(N), it can be concluded that, when N $\rightarrow \infty$, the result will give the accurate value of ellipsoid.