Discussions for P342 Assignment-8

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Discussion about Q1:

On Q1 for 5 different steps nmbers (Steps no. - 250, 450, 650, 850 and 1050) 2-dimensional Random Walk simulation was performed. For every steps number (i.e. 250 or 450 or 650 or 1050) 100 walks were performed. As asked on the question Only 5 walks out of 100 for every steps was plotted on 5 different graphs. Radial distance, R_{rms}, X_{avg}, Y_{avg} was calculated by taking average of 100 walks for every steps and R_{rms} vs $\sqrt{Stepsnumber}$ graph was plotted. Theoretically, value of X_{avg} and Y_{avg} is 0 and value of R_{rms} is equal to $\sqrt{Steps\ number}$ (Therefore for R_rms vs $\sqrt{Stepsnumbers}$ plot should be straight line). The calculated X_{avg} and Y_{avg} is close to 0 and R_rms vs $\sqrt{Stepsnumbers}$ plot is almost a straight line.

Discussion about Q2:

For 100, 200 , 300...., 40000 random points volume of ellipsoid and fractional error was calculated and Steps vs calculated volume was plotted with the analytical value of volume of the given ellipsoid (i.e. 12.56637), convergence to analytical value wit increasing points no. observed on the graph Fractional error vs points number was also plotted and decrease of error with increasing steps no. observed. For total 10000 random points 3-dimensional plot of the ellipsoid was also plotted. The random points which were inside the specified dimension of the ellipsoid are counted for calculation of volume and plotted on the 3-d graph