

Assignment 8

1. Calculate the volume of an k -dimensional unit ball using Monte Carlo method using different number of points.
2. Apply an adaptive method (by doubling the number of randomly chosen points) to calculate the result to two places of decimal with high probability. How many points are used.
3. Write a program to calculate the points and times of first crossing out of the unit ball starting at a given point in 3-dimensional space. Use a random walk of chosen maximum step size h .
4. Generate 100 pairs (x_i, y_i) using a formula of the form $y = 2 * \cos(x) + 3 * x^2 + \epsilon$ where ϵ is uniformly randomly chosen from $(-0.001, +0.001)$. Use linear best fit to fit this data to the model $2 = a \cos(x) + bx^2$ and find the values of a and b .