

Problem 2: Monte Carlo integration

- 1) We first want to compute the integral of $\sin^2(x)$ between $x=0$ and $x=\pi/2$. Write a Monte Carlo code to obtain the integral of $\sin^2(x)$ by using $N=10,000$ random points. Find a strategy to define the adequate framing "box". For the example of the area of the circle we were using a framing square, you need to adapt the same strategy to estimate the area contained under the function $\sin^2(x)$.
- 2) We now want to obtain the volume contained between a sphere of radius 0.65 and another larger sphere of radius 1. Modify the Monte Carlo written for the volume of a sphere. Use $N=10,000$ sampling points (random points in the cube).