LabWork #9
MAT 116E-Advanced Scientific and Engineering Computing (MATLAB)
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Main Task (Monte Carlo Method to Evaluate the Definite Integral)

A simple Monte Carlo Simulation to approximate the value of the definite integral

$$I = \int_0^{1.5} \frac{1}{1 + \sinh(2x)\ln(x)} \approx 3.4437$$

is made by randomly selecting points $\{(x_i, y_i)\}_{i=1}^{n}$ in the compact region bounded by $x = 0$, $y = 0$, $x = 1.5$ and $y = 10$. The approximate value of I can be found by Monte Carlo Method by determining the ratio $\frac{I}{15} \approx \frac{m}{n}$ where m is the number of points that satisfy

$$y_i \leq \frac{1}{1 + \sinh(2x_i)\ln(x_i)}$$

and n is the sample size.
Here, there is a simple visualization of this simulation.

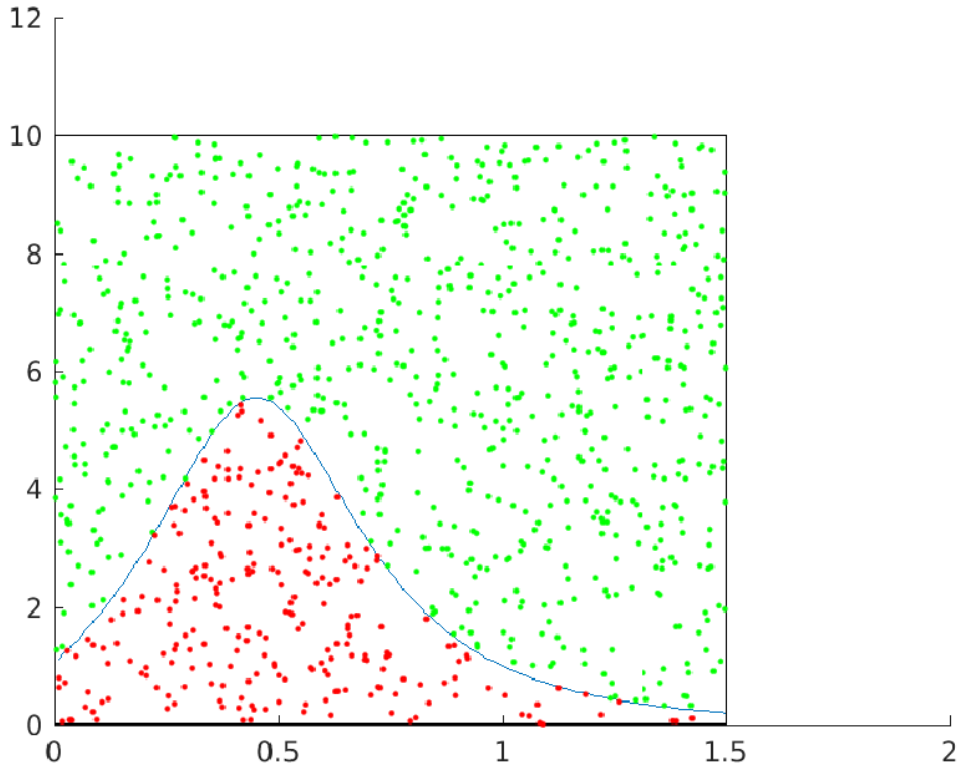

Figure 1: A Simple Visualization of Estimating I with 1000 Random Points.

REQUIRED

Write a MATLAB program, which

1. evaluates I by randomly selecting 1000 points (sample size) in the compact region defined above and
2. plots the same visualization same as in Figure 1.

Submission Information

Any LabWork submitted after class will be subject to a 20-point deduction per 24 hour period. Extensions should be requested at least 3 days in advance and will only be granted for exceptional reasons (e.g., conference submission). You may work with your friends. Collaboration is strongly recommended. However, each student should be able to present his/her program.