

Problem Set 1

Question 1. *LaTeX and Overleaf:* Use the *Learn LaTeX in 30 minutes* tutorial found here: https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes along with the matlab code below to reproduce the document here: [Monte_Carlo.pdf](#). Replace "Your Name" in the matlab code and the final document with your own name. This will produce data that is specific to you. The matlab code can also be download as a file from here [circle.m](#). When you execute the code in circle.m in matlab it produces a figure file which you will need to upload to Overleaf and estimates the value of π . Use this data in your version of Mote_Carlo.pdf. Upload both the pdf and the .tex versions along with your version of circle.m (with your name in the correct spot) to blackboard. There are also nice video tutorials for LaTeX. Here is a short [one](#) and a longer [one](#). There is also a playlist with a number of good [videos](#).

```
1 %% Setup
2 N=1e4;           % Number of points
3 t=0:.01:2*pi;   % helper list
4
5 rng(sum('Your Name'),'twister'); % reset random number generator
6
7 %% Monte Carlo integration for the area of a circle
8
9 u=2*rand(2,N)-1; % Choose random point in the 2D plane [-1 1]x[-1 1]
10 x=u(1,:);      % Nicier names
11 y=u(2,:);
12
13 ii=(x.^2+y.^2<=1); % True for points inside circle of radius 1
14
15 %% Plot points
16 plot(x(ii),y(ii),'b.',x(~ii),y(~ii),'r.',sin(t),cos(t),'k');
17 axis('square')
18 set(gca,'fontsize',20);
19 xlabel('x-axis');
20 ylabel('y-axis');
21 title('Random Points');
22 print -depsc2 random.eps
23
24 %% Calculate and display Pi
25
26 myPI=4*sum(ii)/N;
27 disp(myPI)
```