

Homework 5 - Math 381 A - Autumn 2015 - Dr. Matthew Conroy

1. Consider a poisson process with mean λ . Suppose we are interested in choosing a time increment for a simulation. We want the time increment to be small enough that the probability of two events in one time increment is $1/1000$ the probability of exactly one event in one time increment. What should the length of the time increment be?
2. Write code to do a simulation like Buffon's needle experiment. For this version, suppose the plane is crossed with parallel lines in both horizontal and vertical directions, and each resulting square is crossed with one diagonal. Experiment with two needle lengths: equal to the width between the main parallel lines, and one-half that length. Plot the estimate of the probability versus the number of iterations for one run of each simulation (run it long enough that you can see some asymptotic behavior). Discuss the estimate. Include the code in your writeup.