

Engsci 213 Continuous Probability Models - R Exercises (v. 1)

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Continuous probability models - R Exercises

Overview

Check out the R Markdown notebook I put on Canvas for reference. See the links at the beginning for getting started with R. Alternatively, see the book ‘Introduction to Probability and Statistics Using R’ by Kerns, also on Canvas.

If you get stuck I recommend Goolging it - ‘Stack Exchange’ links are usually good! If you program often you will inevitably end up using this as your default strategy!

Tasks

By referring to e.g. <http://www.statmethods.net/advgraphs/probability.html>, the lecture notebook or any other source of documentation

- plot the uniform, exponential and normal density distributions using R
- plot the cumulative distributions
- generate a large number of simulated samples from these distributions and plot the empirical (sample-based) counterparts of the above density and cumulative distribution functions
- Choose suitable n, p and λ combinations so that the Normal distribution becomes a good approximation to the Binomial and Poisson distributions respectively. Plot the results.
- Calculate the answers to the hand calculations using R. Test out the CLT theorem for the hand calculation exercise above.
- Suppose $X \sim N(10, 3)$. Calculate the probability that $X \geq 6$ using R.
- If you have completed the last task in the assignment, use the same ‘learning algorithm’ to infer the mean of a Normal distribution given the standard deviation and a sample (generated according to a chosen ‘true-but-unknown-to-the-algorithm mean’).