MA681 - Spring 2015 Problem Set #2

Due 27 Feb 2015

This is short assignment about probability distributions. An additional requirement of the assignment is that you must use R Markdown. The purpose of markdown requirement is to give you practice making documents that combine working code, written descriptive material, and graphical output.

For question 1, submit a document, or a URL to a document, you make with Markdown. It is sufficient to make an R Notebook using the simple metadata header as described in documentation I posted under the Information tab on Blackboard. I hope that by the end of the assignment you will see that you could do much more than an R Notebook.

For question 2, submit screen shots or document files as appropriate. Put your name into the document to individualize it.

My estimate is that this assignment should take about 3 hours. It would be helpful to know how much time the exercise actually takes. The time you spent will not be reflected in your grade, so please report as accurately as you can.

1. **Goodness of fit in R**

   Read section 6.0 (pp 16-20) from "Fitting Distributions with R"' which is in the folder with this assignment. You can also find this document at http://cran.r-project.org/doc/contrib/Ricci-distributions-en.pdf.

   Now, consider the following discrete bivariate distribution

		Y		
		-1	**0**	**1**
X	**-1**	1/12	1/6	1/12
	0	1/12	1/6	1/12
	1	1/6	0	1/6

   Calculate the distributions of $Z = X_n + Y_n$, $X+Y$, X, Y. Using the bivariate distribution above, simulate 10, 100, and 1000 random X,Y pairs. Use a QQ plots and the Kolmogorov-Smirnov test to test the fit between your simulation and your calculated distribution. In discussing your results, refer to the material in Wasserman Chapter 5, especially Theorem 5.5.

2. **R Markdown**

   In R, use the **File > New File > R Markdown** command to bring up the dialog box that initiates R Markdown document output to HTML, PDF, and Word. Try all three selections. You will find that when you make a selection, RStudio gives you a Markdown template as a starting point. Enter your name in each of the templates and produce the document. You can submit the document or a screen shot of the document.

   Now go back to R Markdown one more time and select Shiny. Again, you will get a demonstration document. Run the document. Submit a screen shot.