Reading for Nov. 9 section discussion

October 29, 2015

The goal of this problem is to think carefully about the design and interpretation of simulation studies. In particular, we'll work with Chen et al. (2012), a recent article in JASA (the Journal of the American Statistical Association), which is a leading statistics journal. The article is available as PDF under the 'section' directory on Github. Read the first two pages and Section 4 of the article, as well as Sections 4 and 5 of the Unit 10 class notes. You don't need to understand their algorithm for testing the null hypothesis [i.e., you can treat it as some black box algorithm], though it may help to skim through some of the material on the algorithm for context.

- What are the goals of their simulation study and what are the metrics that they consider in assessing their method?
- What choices did the authors have to make in designing their simulation study? What are the key aspects of the data generating mechanism that likely affect the statistical power of the test?
- Suggest some alternatives to how the authors designed their study. Are there data-generating scenarios that they did not consider that would be useful to consider?
- Give some thoughts on how to set up a simulation study for their problem that uses principles of basic experimental design (see the Unit 10 notes) or if you think it would be difficult, say why.
- Do their figures/tables do a good job of presenting the simulation results and do you have any alternative suggestions for how to do this? Do the authors address the issue of simulation uncertainty/simulation standard errors and/or do they convince the reader they've done enough simulation replications?
- Interpret their tables on power (Tables 4 and 6) - do the results make sense in terms of how the power varies as a function of the data generating mechanism?
- Discuss the extent to which they follow JASA's guidelines on simulation studies (see the end of the Unit 10 class notes for the JASA guidelines).