

Math 8452, Homework #1. Due on 6/3/20 (Wed section) or 6/4/20 (Thu section).

Reading from the textbook:

- Read Chapter 1 on the advantages of nonparametric methods.
- Read Section 2.1 on an exact binomial test procedure related to the sign test.
- Read Section 3.4 on the sign test.
- Read Section 3.6 on confidence intervals for the median.
- For next week, read Section 3.1 on the signed rank test.
- For next week, read Section 4.1 on the rank sum test.

Problems to do:

1. (To turn in.) Given below are the lengths of 12 randomly selected issues of a statistics journal. Working by hand, do each of the following. (a) Find a nonparametric 80% confidence interval for the median length of an issue. What is the exact coverage probability of your interval? (b) Sketch the 95% Kolmogorov-Smirnov confidence band for the population distribution function. The critical value is $c_{12,0.05} = 0.375$. (c) Find a 95% Agresti-Coull confidence interval for the proportion of issue lengths that exceed 100 pages. (d) Using level 0.05, test for evidence that the median length of an issue is less than 100 pages. Please state your hypotheses, give the p -value, and give your conclusion in context. (e) Using level 0.10, test for evidence that the 40th percentile is not 70 pages. Please state your hypotheses, give the p -value, and give your conclusion in context.

他们有的是same value
怎么排序的

69 92 92 99 96 115 95 96 103 92 77 117

对于2 tail 的p 我表示有点疑惑

2. (To turn in.) Working by hand, find 90% nonparametric confidence intervals for the 30th and 50th percentiles for the case when $n = 9$. What is the exact coverage probability for each?
3. (To turn in - R code and written answers.) Using the simulation studies that we did in class as a guide, do a simulation study to assess the robustness of the one-sample two-tailed t test with exponential data. For sample sizes ranging from 5 to 50, simulate to estimate the true α level for a nominal level-0.05 test when the data are exponential rather than normal. What do you conclude about whether the test is robust or not? (Hint: Note that the true mean is not 0.)
4. (Not to turn in.) If you haven't done so already, please download R to your computer. Work through the R guide posted on the webpage. Let me know if you run into any questions!

Non-normal population distributions, especially those that are thick-tailed or heavily skewed, considerably reduce the power of the test

The t -test assumes that the means of the different samples are normally distributed; it does not assume that the population is normally distributed.

The t -test is invalid for small samples from non-normal distributions, but it is valid for large samples from non-normal distributions