Math 324 Fall 2004
Assignment 5
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The aim of this assignment is for you to use a computer intensive technique to estimate a confidence intervals. You will need to write some R code or Minitab macros to complete this assignment. Do not leave it to the last moment to begin.

You should submit your solutions to this assignment as a written report. In other words, it is not enough to submit pages of computer output with no interpretation. If you wish to submit your analysis code, please attach it as an appendix to your report. As this is the fifth assignment you are expected to take more care in the write-up. For example, properly label plots, write clear paragraphs describing the results of your analysis and at the end of your report write a brief conclusion summarizing the main results.

A bootstrap confidence interval for the median

In this part you will compute a bootstrap confidence interval for the median. There is no general result like the Central Limit Theorem for the sample median so without the bootstrap we might not otherwise be able to produce a confidence interval.

Using the data in the file *mediandata.dat* on the webpage and the bootstrap technique give a 95% confidence interval for the median (of the population from which this data is sampled). You should use at least 1000 bootstrap samples.

A bootstrap confidence interval for the variance of normal data

In this part you will compute a bootstrap confidence interval and compare it with a confidence interval you derive based upon theory.

1. Simulate a sample of 20 random numbers from a normal distribution with mean 16 and standard deviation 4

2. Compute a 99% confidence interval for σ^2 using the theoretical results discussed in class (and in your textbook).

3. Take at least 1000 bootstrap samples from your 20 numbers and based on these give a 99% confidence interval for σ^2.

How does your bootstrap confidence interval compare to the confidence interval derived from theory?