

22S:166

Homework 5

Due Fri. Sep. 29 in class.

1 Bootstrap

1. Consider the airconditioning data for which we performed a parametric bootstrap in class. Data are listed below.

```
hours
3
5
7
18
43
85
91
98
100
130
230
487
```

Carry out a *nonparametric* bootstrap analysis concerning the log of the sample mean as an estimator of the log of the population mean. Do the analysis twice: 1) using R code you write yourself, and 2) using the `boot` function in the `boot` package. Both analyses should:

- (a) Estimate the standard error of the log sample mean.
 - (b) Estimate the bias, and produce an “unbiased” estimate.
 - (c) Produce confidence intervals for the log population mean by the percentile method and the bias-corrected percentile method.
2. The bootstrap is not foolproof. To see this, consider analysis of a binomial model with “n” trials. You observe 0 successes. Discuss what would happen if you were to use the standard, non-parametric bootstrap in constructing a 95% C.I. for the binomial parameter p .

2 Jackknife

Carry out the same analysis of the airconditioning data, but use the jackknife to estimate the standard error, bias, and confidence intervals. Compare the results to those obtained with the bootstrap.