Stat 471: Homework 04

Moo K. Chung
mchung@stat.wisc.edu

October 29, 2003

Due Date: November 12, 1:20pm. No late assignments will be accepted or graded. There will be 10% bonus points for exceptional solutions.

1. From `strength.data`, compute a 95% bootstrap confindence interval for the correlation coefficient of `arm` and `grip` strengh.
2. Harry's restaurant business fluctuate in successive years between two states: 1 (bankruptcy) and 2 (solvency). The transition matrix is given by

$$\mathbf{P} = \begin{pmatrix} 1 & 0 \\ 0.75 & 0.25 \end{pmatrix}.$$

   Check if the states are recurrent. What is the invariant distribution for the Markov chain? What is the expected number of years until Harry's restaurant goes bankrupt assuming that it starts from the state of solvency?

3. Find the general form of $\mathbf{P}^n$ and compute $\lim_{n\to\infty} \mathbf{P}^n$.
4. Using MCMC generate 10,000 numbers that follow the lognormal dsitribution

$$f(x) = \frac{1}{x\sqrt{2\pi}} \exp\Big(-\frac{(\ln x)^2}{2}\Big)$$