Homework to Week 1

Statistics: Principle, Methods and R (II)

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Week 1, 27 Februray 2017

The homework is due on Monday, 6 March 2017. Please hand in the solutions to the teaching assistant He Siyuan at the beginning of the lecture.

1. Obtain a $1-\alpha$ confidence interval for estimating the Bernoulli success probability p with observations X_1, \ldots, X_n using the following result coming from applying Hoeffding's inequality. (Note b=1 and a=1 in the Bernoulli case.)

$$\mathbb{P}(\sqrt{n}\,\overline{X}_n \ge t) \le \exp\left(-\frac{2t^2}{(b-a)^2}\right).$$

- 2. Let $X_1, \ldots, X_n \sim \text{Uniform}(0, \theta)$. Let $f(\theta) \propto 1/\theta$. Find the posterior density.
- 3. Consider the Bernoulli(*p*) observations

 $0 \quad 1 \quad 0 \quad 1 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0.$

Plot the posterior for p using these priors: Beta(1/2, 1/2), Beta(1, 1), Beta(10, 10) and Beta(100, 100).