Fundamental Concepts of Statistics

Exercise session 8

1. Compute the a 95% confidence interval for the parameter p from exercise 4 (session 7).

2. Compute the a 95% confidence interval for the parameter θ from exercise 5 (session 7).

3. Compute the a 95% confidence interval for the parameter θ from exercise 6 (session 7).

4. Consider you observed stock prices for 6 food industry conglomerates (Coca Cola, McDonalds, Kraft, Dole, Starbucks, Wendys) in January 2002 and January 2003. Suppose that the stock prices are normally distributed. The vector of stock prices in 2002 was $(43, 27, 36, 27, 24, 30)$. The vector of stock prices in 2003 was $(40, 14, 32, 32, 23, 27)$. Compute a 95% confidence interval for the difference in stock prices over a year. How would you test that the difference is equal to 2?

5. Consider you observed heights of 6 men and 6 women. Suppose that heights are normally distributed. The vector of heights for men was $(192, 171, 178, 185, 180, 189)$. The vector of heights for men was $(161, 182, 155, 173, 173, 165)$. Compute a 95% confidence interval for the difference between height of men and women. How would you test that the difference is equal to 2?

6. Let $X_1, \ldots, X_n$ be a random sample from X with density function $f(x; \theta) = 2\theta^{-1}xe^{-x^2/\theta} \cdot \mathbb{1}\{x > 0\}$ for $\theta > 0$. Use an appropriate approximation to find the likelihood ratio test of size α for the testing problem: $H_0 : \theta = \theta_0$ versus $H_1 : \theta \neq \theta_0$.