Lab FDSAI

1. (Follow-up of Exerc. 1 of Lab 3) In order to ensure efficient usage of a server, it is necessary to estimate the mean number of concurrent users. According to records, the average number of concurrent users at 100 randomly selected times is 37.7, with a standard deviation 9.2.

   (a) (Lab 3) Construct a 90% confidence interval for the expectation of the number of concurrent users.

   (b) At a significance level of 1%, can it be stated based on the obtained information that the average number of users of the server is less than 35?

2. (Exerc. 3 of Lab 3) A pharmaceutical company is looking to purchase a bottling machine to increase efficiency in the production of cough syrup. Currently, the company uses a robotic system that can fill the corresponding containers with the fixed amount of cough syrup, with a standard deviation of 1.5 ml. The machine under consideration for purchase was subjected to 30 tests, for which a sample variance of 2.5 ml^2/bottle was observed. At a significance level of 95%, is the purchase justified?

3. Suppose that a 99% confidence interval for the mean μ of a normal distribution is found to be $(-2.0, 3.0)$. Would a test of $H_0 : \mu = -3$ versus $H_A : \mu \neq -3$ be rejected at the 0.01 significance level?

4. A dataset of the passenger list for the Titanic disaster is available at `http://www.statsci.org/data/general/titanic.html` .

   (a) Assess the evidence that survival is independent of passenger ticket class.

   (b) Assess the evidence that survival is independent of passenger gender.