5. seminar

Problem 1

The capacity of an escalator is 8000 kg and it is designed to carry 100 persons. Assume that the weight of a person follows a normal distribution with a mean value 75 kg and a standard deviation 10 kg. Find the probability that a random sample of 100 people will have a total weight greater then permitted weighting of the escalator.

Problem 2

A plane speed was measured 5 times and the realization of sample mean was 870,3 m/sec. Find a 95% confidence interval for a parameter μ if the plane speed follows normal distribution with a standard deviation $\sigma = 2.1m/s$.

Problem 3

We assume that the delivery time of the particular consignment company follows normal distribution. 100 consignments were drawn randomly and their delivery time were written down. The sample mean calculated for this random sample is $m = 31.5$ min and from the former times we know that the standard deviation is 5 min. According to these mentioned assumptions find at the significance level 0.05 the upper estimate for the expected delivery time.

Problem 4

A sea depth is measured by an apparatus whose systematic errors of measurement are zero and the random errors of measurement follow the normal distribution with standard deviation $\sigma = 1$ m. Find the number of measurements such that the depth is estimated by the confidence interval of width $= 0.5$ m.

Problem 5

A manufacturer of a latest less expensive sort of light bulbs asserts that his products are as reliable as the more expensive light bulbs of his competitor who declares the mean lifetime to be 5100 hours. To verify manufacturer's assertion 50 light bulbs were chosen randomly and their lifetimes were written down. The mean lifetime was 5100 hours. At the significance level 0.05 find out if the manufacturer's assertion is right. We assume the random sample to be normal with $\sigma = 500$ hours. Use a) classical method, b) confidence interval method, c) p-value method.