

Topics of the statistics examination / oral part

1. Random experiments and the axioms of probability theory
2. Random variables and their properties (expectations)
3. Stochastic convergence and theorems of large numbers
4. The binomial distribution and its properties
5. The uniform, Poisson and exponential distributions and their properties; the Poisson process
6. The normal distribution and its properties
7. The chi-squared distribution and its properties
8. Student's t distribution and its properties
9. The F distribution and its properties
10. Population and sample; sample statistics; estimation methods
11. (Advantageous) properties of estimators
12. Confidence intervals, their interpretation and calculation
13. Confidence intervals of means (one sample / two samples)
14. Confidence intervals of variances
15. Hypothesis testing: null- and alternative hypotheses; Type I and Type II errors
16. Tests on means of a single sample
17. Tests on means of two samples
18. Tests on means of several samples (AOV)
19. Tests on variances of a single sample
20. Tests on variances of two samples
21. Tests on homoscedasticity (variances of several samples)
22. Test on the correlation
23. Parameter estimation of statistical model functions; linear and nonlinear LSQ
24. Goodness of fit tests

In addition, you will have to solve a statistical inference problem on some sample(s).