

Multivariate Statistics, MSC

Exam questions (2019)

1. Definition of the multivariate normal distribution, probability density function, properties and level surfaces, and characterization of the multivariate normality via the distribution of the linear combinations of its components.
2. Multivariate central limit theorem and its application to prove the asymptotic χ^2 distribution of the χ^2 statistic.
3. Definition and application of the Wishart distribution and the multivariate form of the Lukács theorem. Sufficient statistics and Fisher information matrix for multidimensional parameter spaces.
4. Maximum likelihood estimation of the parameters of the multivariate normal distribution based on a sample, the properties of the estimates, and the Wishart density.
5. Testing statistical hypotheses for the expectation vector of the multivariate normal distribution in case of known and unknown covariance matrices in one- and two-sample situations.
6. Fisher–Cochran theorem and Analysis of Variance.
7. Principal component and factor analysis.
8. Multivariate regression analysis and the linear model (with deterministic measurement points), Gauss–Markov theorem.

References

- Bolla M., Krámli A., Statisztikai következtetések elmélete, Typotex, Budapest (2005), 5-7. fejezet
- Mardia, K. V., Kent, J. T., Bibby, J. M., Multivariate Analysis, Academic Press, Elsevier Science (1979, 2003)
- Lessons in English on the homepage of the subject (Bolla Marianna).