Abstract of the Ph.D. dissertation

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Approximation of the covariance matrix by selected structures under doubly multivariate data

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The Ph.D. dissertation is dedicated to approximation of the discrepancy between two probability distributions with different covariance matrices, expressed by the entropy or quadratic loss function. Doubly multivariate models that allow for the analysis of data with two sources of variability, for example, when several characteristics are observed repeatedly in time, are considered. The natural dependency structure is then Kronecker product of two symmetric positive definite matrices. The study also considers cases, where one component has additional structure of a compound symmetry matrix or a first-order autoregression process.

The algorithms for determination of the minimum of the respective discrepancy function are applied in simulation studies to identify the covariance structure, to propose estimators of covariance structures and to study their statistical properties, as well as in the research on the power of the tests, to measure the discrepancy between sets of covariance structures under consideration. Algebraic results are interpreted on real data.

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