ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

Invitation to the Doctoral Seminar

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"Algebraic statistics: algebraic invariants in factor analysis models"

N.2.35 | Wednesday, 15 May 2024 | 10:45 a.m.

Abstract
Algebraic statistics is based on the observation that many problems in statistics can be translated into the language of algebra and algebraic geometry. For example, a probability distribution is a point, and a statistical model is a (semi)algebraic set. We will look at one statistical model in more detail: the so-called factor analysis model. It is a special case of a graphical model, which is a probabilistic model for which a graph expresses the conditional dependence structure between random variables. In factor analysis, there are two kinds of random variables: observed variables and hidden factors. All the variables follow a multivariate normal distribution. It has its origins in psychology and found applications in various different areas. The parameter space of a factor analysis model is a subset of the cone of positive definite matrices. This talk focuses on describing the ideal of invariants of factor analysis models. An invariant is a polynomial that vanishes on the parameter space. Besides revealing the geometry of the factor analysis model, invariants can be used as statistics in tests of model fit. As the ideal

of invariants is an elimination ideal, in some cases, Gröbner bases and resultants can be used to write down a basis of the ideal explicitly.

Roswitha Rissner and the Department of Mathematics look forward to seeing you at the talk!