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Department of Statistics and Biostatistics

DEPARTMENT OF STATISTICS AND BIOSTATISTICS

Lutz Duembgen
Department of Mathematics and Statistics
Institute of Mathematical Statistics and Actuarial Science
University of Bern

Geodesic Convexity and Regularized Scatter Estimation

April 19, 2017
3:20 – 4:20pm
Light refreshments will be served
110 Frelinghuysen Road
Hill Center, Room 552

Abstract: In the first part of this talk we provide a brief introduction to a particular Riemannian geometry on the space of symmetric, positive definite matrices. Then we introduce the notions of geodesic convexity and geodesic coercivity of functions on this metric space. In the second part it is shown that the target functions underlying standard M-estimators of multivariate scatter are geodesically convex and, under mild regularity conditions, even strictly geodesically convex and geodesically coercive. In high dimensional settings, however, the latter conditions are necessarily violated which necessitates some sort of regularization. We present some suitable geodesically convex penalty functions. The resulting regularized estimators with tuning parameter chosen by some cross validation scheme are illustrated in a small simulation experiment. (This is joint work with David Tyler, Heike Schuhmacher, Klaus Nordhausen, Markus Pauly and Thomas Schweizer.)

Bio: Lutz Duembgen studied mathematics at the University of Heidelberg where he graduated with a PhD in 1990. After two years as a postdoc at UC Berkeley and a short stay at the Univ. of Bielefeld he returned for a few years to Heidelberg. In 1997 he was appointed associate professor of stochastics at the Med. Univ. at Luebeck, Germany, and since 2002 he is full professor of statistics at the Univ. of Bern, Switzerland.