Rudolf Beran

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Sokolovská 83, Praha 8 - Karlín

Nonparametric Estimation
of Trend in Directional Data

Consider measured positions of the paleomagnetic north pole over time. Each measured position may be viewed as a direction, expressed as a unit vector in three dimensions and incorporating some error. In this sequence, the true directions are expected to be close to one another at nearby times. A simple trend estimator that respects the geometry of the sphere is to compute a running average over the time-ordered observed direction vectors, then normalize these average vectors to unit length. This talk describes a considerably richer class of competing directional trend estimators that similarly respect spherical geometry. The analysis relies on on a nonparametric error model for directional data imposes no symmetry or other shape restrictions on the error distributions. Good trend estimators are selected by comparing estimated risks of competing estimators under the error model. Uniform laws of large numbers, from empirical process theory, establish when the estimated risks are trustworthy surrogates for the corresponding unknown risks.

About the speaker

Rudolf Beran is Professor of Statistics at the University of California, Davis. He has published over 120 research papers in the fields of asymptotic and robust statistics, and computational aspects of advanced statistical procedures. He has been included among ISI Highly Cited Researchers. He was born in Prague but since early childhood he lived in Canada and then in the U.S. He always kept close ties to the country of his birth and has maintained a long-standing collaboration with the Department of Probability and Mathematical Statistics at MFF UK. In the spring semester 2007 he taught an advanced course in mathematical statistics for doctoral students. During the visit in Prague he will be awarded the title of the Guest professor of the Charles University.

The 17th Colloquium Lecture of the School of Mathematics is organized in cooperation with *Department of Probability and Mathematical Statistics*, MFF UK.

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