Title: Kriging Over Space and Time Based on a Latent Reduced Rank Structure

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Time & Place:
Wednesday, May 3, 2017
4pm, Room 331 SMI
Cookies & Coffee @ 3:30, Rm 1210

Abstract: We propose a new approach to extract nonparametrically covariance structure of a spatio-temporal process in terms of latent common factors. Though it is formally similar to the existing reduced rank approximation methods (Section 7.1.3 of Cressie and Wikle, 2011), the fundamental difference is that the low-dimensional structure is completely unknown in our setting, which is learned from the data collected irregularly over space but regularly in time. We do not impose any stationarity conditions over space either, as the learning is facilitated by the stationarity in time. Krigings over space and time are carried out based on the learned low-dimensional structure. Their performance is further improved by a newly proposed aggregation method via randomly partitioning the observations accordingly to their locations. A low-dimensional correlation structure also makes the kriging methods scalable to the cases when the data are taken over a large number of locations and/or over a long time period. Asymptotic properties of the proposed methods are established. Illustration with both simulated and real data sets is also reported.