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Regression Models for Data on Manifolds using Stochastic Processes

Joint work with Stefan Sommer

We present a regression model to describe the relation between euclidean covariates and a response variable defined on a manifold M . The relation is modelled by stochastic development of semi-martingales, defined on the space spanned by the covariates, to M , in which Maximum Likelihood estimation is used to find the model parameters. We describe an estimation procedure which is based on the likelihood for the evolution path of each observation on M . As these paths are unknown, we make use of the Monte Carlo EM algorithm for optimization of the likelihood function in this missing data setup.