LEARNING THE REGULARITY OF MULTIVARIATE FUNCTIONAL DATA

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Abstract

Combining information both within and between sample realizations, we propose a simple estimator for the local regularity of surfaces in the functional data framework. The independently generated surfaces are measured with er- ror at possibly random discrete times. Non-asymptotic exponential bounds for the concentration of the regularity estimators are derived. An indicator for anisotropy is proposed and an exponential bound of its risk is derived. Two applications are proposed. We first consider the class of multi-fractional, bi- dimensional, Brownian sheets with domain deformation, and study the non- parametric estimation of the deformation. As a second application, we build optimal, bivariate kernel estimators for the reconstruction of the surfaces.

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