

**Lecture Series by Alexander Meister on: Linear and nonparametric models in functional data analysis**

We start with an introduction to the field of functional data analysis. Then we study nonparametric regression with functional covariates where the theoretical framework allows us to generalize these findings to data from a Polish metric space with specific conditions on the metric entropy. We derive the optimal convergence rates for a nonparametric estimator of the regression mapping. Also we show that the same minimax rates occur in classification of functional data based on training samples. Furthermore we consider the problem of functional linear regression and prove asymptotic equivalence to a white noise inverse problem under known covariance operator. This result is useful to derive an asymptotically sharp minimax estimator of the regression function even if the design distribution is unknown in advance.