Functional Data Analysis (L16)

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Functional Data Analysis (FDA) is the study of the statistics of curves and surfaces. In most statistical analyses, the object of study is either a number (one dimensional univariate statistics) or a vector (finite dimensional multivariate statistics). In FDA the object of study is usually considered to be infinite dimensional, often but not always, with some inherent smoothness characteristics. In this course, we will examine both the theory behind such data analysis and the myriad of different places that these data arise.

The course will likely cover the following topics:

- Definition of Functional Data
- Functional Principal Component Analysis
- Registration
- Covariance Operators
- Functional Linear Models

Prerequisites

Basic knowledge of statistics, probability, linear algebra and real analysis.

Literature

1. Ramsay, J.O. and Silverman B.W. *Functional Data Analysis* 2nd edition, Springer, 2005.
2. Horvath, L. and Kokoszka, P. *Inference for Functional Data with Applications*, Springer, 2012.
3. Kokoszka, P. and Reimherr, M. *Introduction to Functional Data Analysis*, Chapman and Hall, 2017.

Additional support

Three examples sheets will be provided and three associated examples classes will be given. There will be a one-hour revision class in the Easter Term.