



Department of Mathematics and Statistics

Colloquium

Tuesday October 29

AMB 164 4:00 - 5:00 pm

Introduction to Functional Data Analysis: Applications in R

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Abstract

Functional Data Analysis (FDA) is a field of statistics whose applications are rapidly growing. The number of published articles incorporating functional statistical techniques has steadily increased since formalized numerical methods appeared in 2003. FDA analysis has been used in a variety of studies with the highest frequency being time-series modeling and physical science applications. The core components for using FDA as a statistical method will be introduced. Preparing and modeling variables as functional data will be presented along with introductory R code relying on several key FDA packages. These methods will highlight the importance of basis representations and penalized smoothing on the resulting functional covariates. The functional representation has significant impact on the resulting statistical analysis and the production of additional functional variables modeled from derivative curves. The ability to produce and work with derivative information is one of the commonly incorporated uses of FDA. Once the observations have been properly modeled as functional data, descriptive statistics such as mean functions or correlations between functional covariates can be investigated. Several statistical tests will be discussed including tests for significantly different mean functions and introductory examples of the different forms for functional linear models. The discussion will conclude with current projects the author is involved in that are incorporating the use of FDA.

Refreshments at 3:45