

# Seminar in Statistics: Functional Data Analysis

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Mo, 15-17 Uhr, HG E 1.1

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## § 1 Converting discrete to functional data

### I **Basis functions I** (24.02.2014, J. Peters)

Marco Eigenmann, Tobia Fasciati  
Chapter 3; Chapter 4 (not chapter 4.5).

### II **Basis functions II** (03.03.2014, J. Peters)

Gian Thanei, Andreas Elsener  
Chapter 4.5; Chapter 5.

## § 2 Registration

### III **Registration** (10.03.2014, R. Dezeure)

Lucas Enz, Florian Fricker  
Chapter 7; Gervini and Gasser: “Self-modeling warping functions”. *Journal of the Royal Statistical Society (Series B)*, 66(4), p. 959-971, 2004.

## § 3 Principal component analysis for functional data

### IV **Functional PCA I** (17.03.2014, R. Dezeure)

Hannes Toggengruber, Andrea Gabrielli  
Chapter 8; estimation of covariance matrix; Karhunen-Loève theorem

### V **Functional PCA II** (24.03.2014, R. Dezeure)

Clara Pelloni, Alice Mazzolini  
Chapter 9 and Chapter 10

## § 4 Functional linear models

### VI **Functional response and the concurrent model** (31.03.2014, C. Kerkhoff)

Christoph Glanzer, Stephan Artmann

Chapter 13: functional response, multivariate covariates; Chapter 14: functional response, functional covariate with concurrent model

**VII Functional covariates** (07.04.2014, R. Dezeure)

Patrick Zöchbauer, Edmond Murati

Chapter 15: scalar response, functional covariates; Chapter 16: functional response, functional covariates

## § 5 Differential equation models

**VIII Differential Equations I** (14.04.2014, C. Kerkhoff, 1st meeting on 28.3. instead of 31.3.)

Laura Gulfi, Roberto Skory, Mehdi Bida

Chapter 18 and Chapter 19 up to (including) 19.4

**IX Differential Equations II** (05.05.2014, C. Kerkhoff)

Giona Casiraghi, Julien Schroeter

Chapter 19 from (including) 19.5 and J. O. Ramsay, G. Hooker, D. Campbell and J. Cao: “Parameter estimation for differential equations: a generalized smoothing approach”. *Journal of the Royal Statistical Society (Series B)*, 69(5), 2007.

## § 6 Nonparametric functional data analysis

**X Nonparametric Prediction** (12.05.2014, H. Künsch)

Vera Stalder, Heidi Pang, Mara Nägelin

Chapter 5 in Ferraty and Vieu: “Nonparametric Functional Data Analysis”, Springer (2006), available online from ETH library; from Chapter 6 and 7 only regression (same book)

**XI Nonparametric Classification** (19.05.2014, H. Künsch)

Sabrina Dorn, Peter Michailow

Chapter 8 (classification) and 9 (clustering) from the same book

## § 7 Sparse data

**XII Sparse data** (26.05.2014, H. Künsch)

Sriharsha Challapalli, Nina Roth

Yao, Müller and Wang: “Functional Data Analysis for Sparse Longitudinal Data”. *Journal of the American Statistical Association*, 100(470), p. 577-590, 2005.

**Questions:** number  $-4$  modulo 12, e.g. group VI asks questions to group II.

**Feedback:** number  $+4$  modulo 12, e.g. group XI gives feedback to group III.