
Contents

Preface	ix
Editors	xi
Contributors	xiii

PART I: Introduction and Historical Overview

Chapter 1 Advances in longitudinal data analysis: An historical perspective	3
<i>Garrett Fitzmaurice and Geert Molenberghs</i>	

PART II: Parametric Modeling of Longitudinal Data

Chapter 2 Parametric modeling of longitudinal data: Introduction and overview	31
<i>Garrett Fitzmaurice and Geert Verbeke</i>	
Chapter 3 Generalized estimating equations for longitudinal data analysis	43
<i>Stuart Lipsitz and Garrett Fitzmaurice</i>	
Chapter 4 Generalized linear mixed-effects models	79
<i>Sophia Rabe-Hesketh and Anders Skrondal</i>	
Chapter 5 Non-linear mixed-effects models	107
<i>Marie Davidian</i>	
Chapter 6 Growth mixture modeling: Analysis with non-Gaussian random effects	143
<i>Bengt Muthén and Tihomir Asparouhov</i>	
Chapter 7 Targets of inference in hierarchical models for longitudinal data	167
<i>Stephen W. Raudenbush</i>	

PART III: Non-Parametric and Semi-Parametric Methods for Longitudinal Data

Chapter 8 Non-parametric and semi-parametric regression methods: Introduction and overview	191
<i>Xihong Lin and Raymond J. Carroll</i>	
Chapter 9 Non-parametric and semi-parametric regression methods for longitudinal data	199
<i>Xihong Lin and Raymond J. Carroll</i>	

Chapter 10	Functional modeling of longitudinal data	223
	<i>Hans-Georg Müller</i>	
Chapter 11	Smoothing spline models for longitudinal data	253
	<i>S. J. Welham</i>	
Chapter 12	Penalized spline models for longitudinal data	291
	<i>Babette A. Brumback, Lyndia C. Brumback, and Mary J. Lindstrom</i>	
PART IV: Joint Models for Longitudinal Data		
Chapter 13	Joint models for longitudinal data: Introduction and overview	319
	<i>Geert Verbeke and Marie Davidian</i>	
Chapter 14	Joint models for continuous and discrete longitudinal data	327
	<i>Christel Faes, Helena Geys, and Paul Catalano</i>	
Chapter 15	Random-effects models for joint analysis of repeated-measurement and time-to-event outcomes	349
	<i>Peter Diggle, Robin Henderson, and Peter Philipson</i>	
Chapter 16	Joint models for high-dimensional longitudinal data	367
	<i>Steffen Fieuws and Geert Verbeke</i>	
PART V: Incomplete Data		
Chapter 17	Incomplete data: Introduction and overview	395
	<i>Geert Molenberghs and Garrett Fitzmaurice</i>	
Chapter 18	Selection and pattern-mixture models	409
	<i>Roderick Little</i>	
Chapter 19	Shared-parameter models	433
	<i>Paul S. Albert and Dean A. Follmann</i>	
Chapter 20	Inverse probability weighted methods	453
	<i>Andrea Rotnitzky</i>	
Chapter 21	Multiple imputation	477
	<i>Michael G. Kenward and James R. Carpenter</i>	
Chapter 22	Sensitivity analysis for incomplete data	501
	<i>Geert Molenberghs, Geert Verbeke, and Michael G. Kenward</i>	
Chapter 23	Estimation of the causal effects of time-varying exposures	553
	<i>James M. Robins and Miquel A. Hernán</i>	
Author Index		601
Subject Index		613