<<非参数和半参数模型中的经验似然>>

图书基本信息

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前言

Recent years, the empirical likelihood method has received great attention whenwe deal with statistical inference for nonparametric and semiparametric regressionmodels. These models include fully nonparametric regression, single-index, par-tially linear single-index, varying coefficient models, so on so forth. However , howto efficiently apply the empirical likelihood to these models is of particular interestand challenging. This is because for such models, classical empirical likelihood isnot asymptotically distribution-free any more. The main reason that causes thisdifficulty is that in such models, there are two unknowns： the parameters of in-terest and some nonparametric link functions or additive functions, of which weneed to regard them as infinite-dimensional nuisance parameters. Clearly, whenwe consider constructing confidence regions for the parameters of interest in thesemodels, plug-in estimators are needed to replace the unknown nonparametric linkfunctions. This is a commonly used method in the literatures, but it causes whythe classic empirical likelihood does not have tractable limiting distribution. We inrecent years have been studying this problem and proposed several bias correctionmethods to make the empirical likelihood more useful for these models.Owen （2001） is the only comprehensive book in the empirical likelihood. As thepioneer in this area, Owen did the fundamental work and collected many importantworks in his book. However, for confidence region construction and hypothesistesting, Owens book does not contain the materials about nonparametric andsemiparametric regression models, especially bias correction approaches. Our bookwill present these different methods and the applications. Specifically, we willdescribe and illustrate the empirical likelihood method with "bias-correction" forconstructing empirical likelihood ratios. This book is composed of ten chapters. The first chapter will contain some pre-liminary knowledge. Chapters 2 and 3 will analyze the cross-section data usingthe single-index model and the partially linear single-index model. Chapters 4through 6 will investigate the longitudinal data using the partially linear model, the varying coefficient model and a nonparametric regression model. Chapter 7will discuss nonlinear errors-in-covariables models with validation data. Chapters8 through 10 will investigate missing data using the linear model, a nonparametricregression model and the partially linear model. Each chapter, except for Chapter1, of this book will be self-contained so that the reader could focus on any chapterwithout much effect on the understanding of the others.

内容概要

This book is composed of ten chapters. The first chapter contains the preliminary knowledge about empirical likelihood and other relevant nonparametric methods. Chapters 2 and 3 analyze the section-data using the single-index model and the partially linear single-index model. Chapters 4 through 6 investigate the longitudinal data using the partially linear model, the varying coefficient model and a nonparametric regression model. Chapter 7 discusses nonlinear errors-in-covariables models with validation data. Chapters 8 through 10 investigate missing data under the framework of the linear model, a nonparametric regression model and the partially linear model. Every chapter, except for Chapter 1, of this book is self-contained so that the reader could focus on any chapter without much effect on the understanding of the others, and hence can read any chapters according to reader's own interest. The emphasis of this book is on methodologies rather than on theory, with a particular focus on applications of the empirical likelihood techniques to various semiparametric regression models. Key technical arguments are presented in the "proofs sections" at the end of each chapter. This gives interested researchers an idea of how the theoretical results are obtained. Also from the style of material organization, this book is more likely a lecture note, rather than a textbook. Most materials come from authors' research articles. This book intends to provide a useful reference for researchers and to serve as a lecture note to postgraduate students. It is especially for the people working in the nonparametric and semiparametric statistics areas or applying the empirical likelihood method to other areas.

书籍目录

章节摘录

In clinical trials and observational studies, complete response data are often notavailable for every object. Missing response data may arise due to many circum-stances, including treatment drop-out, study drop-out, mistimed measurements,study subjects failing to report to a clinic for monthly evaluations, respondentsrefusing to answer certain items on a questionnaire, loss of information caused byuncontrollable factors, and so forth. In such circumstances, the usual inferenceprocedures for complete data sets cannot be applied directly. The most com-mon technique used by data analysis is to naively exclude subjects with missingdata, then perform a regression analysis with the remaining data. This is called acomplete-case analysis. Because subjects with any missing variables are excluded,it is well known that the complete-case analysis can give highly inefficient esti-mates （Little and Rubin 1987）. To increase efficiency, one impute （i.e., fill in） aplausible value for each missing datum and then analyze the results as if they werecomplete data. Commonly used imputation methods for missing response valuesinclude linear regression imputation （Healy and Weatmacott 1956, Wang and Rao2001, 2002c）, nonparametric regression imputation （Cheng 1994, Wang and Rao2002b, Chen, et al. 2006）, ratio imputation （Rao 1996）, semiparametric partiallylinear regression imputation （Wang, Linton and H~rdle 2004, Liang, and Wang andCarroll 2007, among others）.

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