

纵向数据非参数混合效应模型的一个局部不变估计

梁华(1),师义民(2)

(1)Department of Biostatistics and Computational Biology,University of Rochester Medical Center,Rochester, NY 14642, USA;(2)西北工业大学应用数学系,西安 710072

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摘要 非参数核回归方法近年来已被用于纵向数据的分析(Lin 和 Carroll, 2000). 一个颇具争议性的问题是在非参数核回归中是否需要考虑纵向数据间的相关性.Lin 和 Carroll (2000) 证明了基于独立性(即忽略相关性)的核估计在一类核GEE估计量中是(渐近)最有效的. 基于混合效应模型方法作者提出了一个不同的核估计类,它自然而有效地结合了纵向数据的相关结构. 估计量达到了与 Lin 和 Carroll的估计量相同的渐近有效性,且在有限样本情形下表现更好. 由此方法可以很容易地获得对于总体和个体的非参数曲线估计.所提出的估计量具有较好的统计性质,且实施方便,从而对实际工作者具有较大的吸引力.

关键词 [交叉核实\(CV\)](#) [核回归](#) [混合效应模型](#) [非参数回归](#) [相对效率](#)

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A LOCAL CONSTANT ESTIMATOR FOR NONPARAMETRIC MIXED-EFFECTS MODELS WITH LONGITUDINAL DATA

Liang Hua(1),Shi Yimin(2)

(1) Department of Biostatistics and Computational Biology,University of Rochester Medical Center,Rochester, NY 14642,USA;(2)Department of Applied Mathematics, Northwestern Polytechnical University, Xi An 710072,China

Abstract Nonparametric kernel regression methods have been proposed for longitudinal data analysis recently (Lin and Carroll, 2000). A controversial question is whether the correlation among longitudinal data should be considered in the nonparametric kernel regression. Lin and Carroll (2000) have shown that the kernel estimator based on working-independence (ignoring the correlation) is most asymptotically efficient in a class of kernel GEE estimators. In this paper we propose a different class of kernel estimators based on the mixed-effects model approach that incorporates the correlation structure of longitudinal data naturally and efficiently. We show that our estimator achieves the same asymptotic efficiency as Lin and Carroll's estimator, but performs better in finite samples. The nonparametric curve estimates for both population and individual subjects (clusters) can be readily obtained from the proposed method. These good properties of the proposed estimator as well as easy implementation are attractive to practitioners.

Key words [Cross-validation \(CV\)](#) [kernel regression](#) [mixed-effects models](#) [nonparametric regression](#) [relative efficiency](#)

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