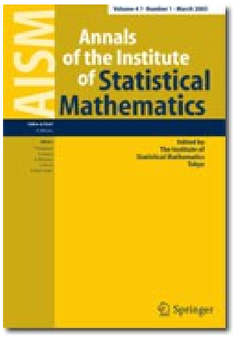

Annals of the Institute of Statistical Mathematics, ISSN 0020-3157
Volume 67, number 1 (february 2015)

Estimation of the error density in a semiparametric transformation model P. 1-18

Benjamin Colling - Cédric Heuchenne

Abstract

Consider the semiparametric transformation model $\Lambda_{\theta_0}(Y)=m(X)+\varepsilon$, where θ_0 is an unknown finite dimensional parameter, the functions Λ_{θ_0} and m are smooth, ε is independent of X , and $E(\varepsilon)=0$. We propose a kernel-type estimator of the density of the error ε , and prove its asymptotic normality. The estimated errors, which lie at the basis of this estimator, are obtained from a profile likelihood estimator of θ_0 and a nonparametric kernel estimator of m . The practical performance of the proposed density estimator is evaluated in a simulation study.

Maximizing leave-one-out likelihood for the location parameter of unbounded densities P. 19-38

Krzysztof Podgórski - Jonas Wallin

Abstract

We propose simple estimation of the location parameter for a density that is unbounded at the mode. The estimator maximizes a modified likelihood in which the singular term in the full likelihood is left out, whenever the parameter value approaches a neighborhood of the singularity location. The consistency and super-efficiency of this maximum leave-one-out likelihood estimator is shown through a direct argument. The importance for estimation within parametric families is discussed and illustrated by an example involving the gamma mixture of normal distributions.

The limited information maximum likelihood approach to dynamic panel structural equation models P. 39-73

Kentaro Akashi - Naoto Kunitomo

Abstract

We develop the panel-limited information maximum likelihood approach for estimating dynamic panel structural equation models. When there are dynamic effects and endogenous variables with individual effects at the same time, the LIML method for the filtered data does give not only a consistent estimator and asymptotic normality, but also attains the asymptotic bound when the number of orthogonal conditions is large. Our formulation includes Alvarez and Arellano (Econometrica 71:1121–1159, 2003), Blundell and Bond (Econ Rev 19-3:321–340, 2000) and other linear dynamic panel models as special cases.

Maximum likelihood estimator for the sub-fractional Brownian motion approximated by a random walk P. 75-91

Nenghui Kuang - Huantian Xie

Abstract

We estimate the drift parameter in a simple linear model driven by sub-fractional Brownian motion. We construct a maximum likelihood estimator (MLE) for the drift parameter by using a random walk approximation of the sub-fractional Brownian motion and study the asymptotic behaviors of the estimator. Simulations confirm the theoretical results and indicate superiority of the new proposed estimator.

Sparse and efficient estimation for partial spline models with increasing dimension P. 93-127

Guang Cheng - Hao Helen Zhang - Zuofeng Shang

Abstract

We consider model selection and estimation for partial spline models and propose a new regularization method in the context of smoothing splines. The regularization method has a simple yet elegant form, consisting of roughness penalty on the nonparametric component and shrinkage penalty on the parametric components, which can achieve function smoothing and sparse estimation simultaneously. We establish the convergence rate and oracle properties of the estimator under weak regularity conditions. Remarkably, the estimated parametric components are sparse and efficient, and the nonparametric component can be estimated with the optimal rate. The procedure also has attractive computational properties. Using the representer theory of smoothing splines, we reformulate the objective function as a LASSO-type problem, enabling us to use the LARS algorithm to compute the solution path. We then extend the procedure to situations when the number of predictors increases with the sample size and investigate its asymptotic properties in that context. Finite-sample performance is illustrated by simulations.

Generalized duration models and optimal estimation using estimating functions P. 129-156

Aerambamoorthy Thavaneswaran...

Abstract

This article introduces a class of generalized duration models and shows that the autoregressive conditional duration (ACD) models and stochastic conditional duration (SCD) models discussed in the literature are special cases. The martingale estimating functions approach, which provides a convenient framework for deriving optimal inference for nonlinear time series models, is described. It is shown that when the first two conditional moments are functions of the same parameter, and information about higher order conditional moments of the observed duration process become available, combined estimating functions are optimal and are more informative than component estimating functions. The combined estimating functions approach is illustrated on three classes of generalized duration models, viz., multiplicative random coefficient ACD models, random coefficient models with ACD errors, and log-SCD models. Recursive estimation of model parameters based on combined estimating functions provides a mechanism for fast estimation in the general case, and is illustrated using simulated data sets.

On the convergence and consistency of the blurring mean-shift process P. 157-176

Ting-Li Chen

Abstract

The mean-shift algorithm is a popular algorithm in computer vision and image processing. It can also be cast as a minimum gamma-divergence estimation. In this paper we focus on the “blurring” mean-shift algorithm, which is one version of the mean-shift process that successively blurs the dataset. The analysis of the blurring mean-shift is relatively more complicated compared to the nonblurring version, yet the algorithm convergence and the estimation consistency have not been well studied in the literature. In this paper we prove both the convergence and the consistency of the blurring mean-shift. We also perform simulation studies to compare the efficiency of the blurring and the nonblurring versions of the mean-shift algorithms. Our results show that the blurring mean-shift has more efficiency.

Intrinsic means on the circle: uniqueness, locus and asymptotics P. 177-193

T. Hotz - S. Huckemann

Abstract

This paper gives a comprehensive treatment of local uniqueness, asymptotics and numerics for intrinsic sample means on the circle. It turns out that local uniqueness as well as rates of convergence are governed by the distribution near the antipode. If the distribution is locally less than uniform there, we have local uniqueness and asymptotic normality with a square-root rate. With increased proximity to the uniform distribution the rate can be arbitrarily slow, and in the limit, local uniqueness is lost. Further, we give general distributional conditions, e.g., unimodality, that ensure global uniqueness. Along the way, we discover that sample means can occur only at the vertices of a regular polygon which allows to compute intrinsic sample means in linear time from sorted data. This algorithm is finally applied in a simulation study demonstrating the dependence of the convergence rates on the behavior of the density at the antipode.

Compound Poisson approximation to weighted sums of symmetric discrete variables P. 195-210

A. Elijio, V. Čekanavičius

Abstract

The weighted sum TeX is approximated by compound Poisson distribution. Here TeX are sums of symmetric independent identically distributed discrete random variables, and TeX denote weights. The estimates take into account the smoothing effect that sums TeX have on each other.