数学与系统科学研究院学术报告

报告题目： A hidden Markov modeling approach to multiple change-points

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时间地点： 2008 年 6 月 23 日上午 10：00—11：00，思源楼 405

摘要： After a brief review of previous frequentist and Bayesian approaches to multiple change-points, we describe a hidden Markov modeling approach that has attractive computational and statistical properties. This approach yields explicit recursive filters and smoothers for estimating the piecewise constant parameters in multiparameter exponential families and generalized linear models, and efficient estimators of the hyperparameters of the hidden Markov model for the parameter jumps. Although the approach is Bayesian in nature, it can be used for frequentist problems such as significance testing of the null hypothesis of no change-points versus multiple change-point alternatives. It can also be used to partition the unknown parameter sequence into segments of equal values and to provide confidence assessment of the segmentation. Applications to array-CGH data analysis in genetic studies of cancer, change-point AR-GARCH modeling of econometric time series, and adaptive stabilization of change-point ARX models in control systems illustrate the versatility of the proposed methodology. Simulation studies and asymptotic theory of its performance are also given.