477. On asymptotics of locally dependent point processes

AIHUA XIA [1]
FUXI ZHANG [2]
1 *University of Melbourne*
2 *Peking University*

We introduce a family of approximating processes that can capture the asymptotic behaviour of locally dependent point processes. We prove two theorems to accommodate respectively the positively and negatively related dependent structures. Three examples are given to illustrate that our approximating processes are doing a better job than compound Poisson processes when the intensity of random events increases.

478. Hidden Markov mixture autoregressive conditional heteroscedastic model

NAFISEH ALEMOHAMMAD
SAEID REZAKHAH
SASAN HOSEIN ALIZADEH
Department of Statistics, Faculty of Mathematics and Somputer Science, Amirkabir university of technology, Tehran, Iran

In the past three decades there has been growing interest in using non linear time series models in nance and economic. For financial time series, the autoregressive conditional heteroscedasticity (ARCH) model and generalized autoregressive conditional heteroscedasticity (GARCH) model, introduced by Engle and Bollerslev, are surely the most popular class of volatility models. These models have been applied extensively in modeling of financial time series models. Merging GARCH model with a hidden Markov chain, where each state of the chain allows a different GARCH behavior extends the dynamic formulation of the model and potentially enables improved forecasts of the volatility. Mixture of autoregressive (MAR), Mixture of autoregressive conditional heteroscedasticity (MAR-ARCH) model by Wong and Li, and mixture GARCH by Zhang and others are also the useful models for nonlinear time series. Despite the benefits of these mixture models, the contribution of distributions is always fixed and it is'nt sensitive to the past observations. However for real processes one might expect better forecast interval if additional information from the past were allowed to affect. Recently some authors such as Bartolucci and Farcomeni have introduced the models that extend the past popular mixture models. These models can improve the forecast by using of hidden Markov structure. In this paper we propose a new approach to model conditional distribution of y_t given past information for nonlinear time series in general state space. we consider a new parsimonious structure for mixture GARCH where the coefficients are determined through latent random variables, following a hidden Markov model. Indeed our model generalizes the mixture GARCH model in reasonable way. The hidden Markov structure in this model proposed to consider the effect of past information. We investigate some of the statistical properties of this model. We derive necessary and sufficient conditions for second order stationarity and obtain the asymptotic second moment value. Also we estimate the parameters of this model. Finally we analyze the efficiency of the proposed model through simulation and comparison of the forecast errors with past models.

479. Poisson disorder problem with control on costly observations

SAVAS DAYANIK
BHARADWAJ KADIYALA
Bilkent University

Suppose that the arrival rate of a Poisson process suddenly changes at some unknown and unobserved random time. The observations are costly, but the controller can turn on and off the observation process at will. The problem is to detect the change time as early as possible with the lowest possible false alarm and observation costs. We formulate it as a stochastic control problem and describe its solution.

480. Multisource Bayesian sequential binary hypothesis testing problem

SEMIH ONUR SEZER [1]
SAVAS DAYANIK [2]
1 *Sabancı University, Faculty of Engineering and Natural Sciences, 34956 Tuzla, Istanbul, Turkey*
2 *Bilkent University, Departments of Industrial Engineering and Mathematics, 06800 Bilkent, Ankara, Turkey*

We consider the problem of testing two simple hypotheses about unknown local characteristics of several independent Brownian motions and compound Poisson processes. All of the processes may be observed simultaneously as long as desired before a final choice between hypotheses is made. The objective is to find a decision rule that identifies the correct hypothesis and strikes the optimal balance between the expected costs of sampling and choosing the wrong hypothesis. Previous work on Bayesian sequential hypothesis testing in continuous time provides a solution when the characteristics of these processes are tested separately. However, the decision of an observer can improve greatly if multiple information sources are available both in the form of continuously changing signals (Brownian motions) and marked count data (compound Poisson processes). In this paper, we combine and extend those previous efforts by considering the problem in its multisource setting. We identify a Bayes optimal rule by solving an optimal stopping problem for the likelihood ratio process. Here, the likelihood ratio process is a jump-diffusion, and the solution of the optimal stopping problem admits a two-sided stopping region. Therefore, instead of using the variational arguments (and smooth-fit principles) directly, we solve