Werk

Titel: Book Reviews - Structure Selection of Stochastic Dynamic Systems.

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Book Review

S. M. Veres: Structure Selection of Stochastic Dynamic Systems. The Information Criterion Approach, Gordon and Breach Sc. Publ., 1991, XIII/342 pp., Hardcover, £28.00/$50.00

This book gives a reliable review on structure selection of stochastic dynamic systems using information criteria and stochastic complexity. Selection of model structure for a dynamic system is part of system identification. The use of information criteria seems to be useful if one has little a priori information about the possible models. After a short introduction in Chap. 2, the most important results of the literature are summarized. In the rest of the chapters the author presents his own results. The information criteria AIC, BIC and ϕ, are reported and their advantages and disadvantages are pointed out. In Chap. 3, the asymptotic theory of discrete-type models is investigated in Bayesian framework. The strong consistency of the complexity criterion for ARMA processes is proved. In Chap. 4, the model validation is concerned. The author concentrates on the invariance principle of likelihood ratios for ARMA processes. After theoretical investigations many simulations are included to show finite-sample behaviour of the model-structure estimators which illustrate the effectiveness and the limitations of the methods. In Chap. 5, the small-sample behavior of several methods is studied. Recursive least squares, extended least squares, on-line two-stage, recursive maximum likelihood, on-line three-stage, off-line two-stage, off-line three-stage and off-line maximum likelihood are studied by simulation. Chapter 6 is concerned with the estimation of continuous-time processes.

The reader can gain his own experience on the working of many methods using the demonstration disk. Finally, in Appendix A results on martingale convergence are given, in Appendix B some PASCAL routines are listed and Appendix C is a description of the attached simulation and identification programs.

This book will be helpful to researchers interested in applying methods of model-structure selection in time series analysis, in control or in signal processing.

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