Statistical analysis of markovian
and related time-series data

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The Markov chain model provides a useful representation of serial
dependence in time-series data. It often happens that while a Markov model
is applicable to an ideal series of observations what one observes in
practice is a related series which is no longer markovian. For instance,
one may observe a grouped chain defined on a new state-space which is a
partition of the original state-space. Also, an observed chain might be
error-contaminated. Moreover, the available data may be in an aggregate
form. Practical circumstances such as these provided a motivation for a
study in this thesis of estimation procedures based on certain functions of
Markov processes.

Least-square method is adopted to obtain estimators of transition
probabilities from aggregate data. Minimum chi-square estimators are
obtained for parameters of grouped Markov chains; consistency and
asymptotic normality of these estimators are established. Various
questions related to grouping, such as loss of information are discussed
and illustrated with some simulation studies. Other topics discussed
include state-estimation and parameter estimation for autoregressive series
contaminated by random noise.