r-th ORDER MARKOV CHAINS AND THE RELATED
TESTS OF THE ORDER OF DEPENDENCE

By

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ABSTRACT

This thesis deals with some probabilistic, statistical and information theoretical aspects of the r-th order Markov Chains. The main concern of the thesis is the tests of the order of dependence.

A detailed review of the chi-square, psi-square, log-likelihood ratio and serial correlation statistics is given. The information theory methods as applied to the observed sequences of states from a stationary process provide a new approach for identifying the order of dependence. The information theory approach leads to a better understanding of the problem and can be used even when chi-square, psi-square approximations are not valid.

We try to give a rigorous presentation of a graphical method based on the estimated conditional entropy losses and outlined by Chatfield (1973).

We finally, investigate the possibility of using α entropies instead of Shannon's entropy in the above mentioned method. The numerical and simulation results indicate that this may avoid some of the shortcomings arising from the use of Shannon's entropy.