# A Copula-Based Markov Chain Model for Attribute Data

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## 摘要

Statistical inference for correlated time series is fundamental in industrial manufacturers, financial engineers, medical researchers, and others. Copula-based Markov chain models can capture serial dependence between observations. So far, only continuous data are considered to perform statistical inference under the copula-based Markov chain model. This paper proposes a statistical method under a copula-based Markov chain model for attribute data that follow the binomial distribution. Proposed methods include computational techniques for the maximum likelihood estimator, data generation algorithms, and simulation methods for computing the average run length. Furthermore, a goodness-of-fit method and a copula selection method are proposed. Simulation studies are conducted to check the accuracy of the proposed estimator and to compare our method with other methods. The proposed method is illustrated by analyzing the Korean stock market data. The proposed methods are implemented in the R "Copula.Markov" package. This is joint work with my former master students Huang Xinwei and Weiru Chen.

Keywords: binomial distribution, Clayton copula, np-control chart, serial dependence.