

THE STUDY OF “LOOP” MARKOV CHAINS

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Abstract

The purpose of my research is the study of “Loop” Markov Chains. This model contains several loops, which could be connected at several different points. The focal point of this thesis will be when these loops are connected at one single point. Inside each loop are finitely many points. If the process is currently at the position where all the loops are connected, it will stay at its current position or move to the first position in any loop with a positive probability. Once within the loop, the movement can be deterministic or random. We’ll consider the Optimal Stopping Problem for finding the optimal stopping set and the Spectral Analysis for our “Loop” system. As a basis, we’ll start with the Elimination Algorithm and a modified version of the Elimination Algorithm. None of these algorithms are efficient enough for finding the optimal stopping set of our “Loop” Markov Chain; therefore, I propose a second modification of the Elimination Algorithm, the Lift Algorithm. The “Loop” Markov Chain will dictate which algorithm or combination of algorithms, would be appropriate to find the optimal set. The second part of this thesis will examine the Analysis of the Covariance Operator for our “Loop” Markov Chain system.