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LIMITING PROBABILITY TRANSITION MATRIX OF A CONDENSED FIBONACCI TREE

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This paper discusses on the construction of condensed Fibonacci trees and present the Markov chain corresponding to the condensed Fibonacci trees. An $n \times n$ finite Markov probability transition matrix for this Markov chain is presented and it is proved that the limiting steady state probabilities are proportional to the first n Fibonacci numbers.

AMS Subject Classification: 05C07, 05C38, 05C75, 05C85 Fibonacci numbers, matrix methods, Markov chains, binary Key Words: search trees, Fibonacci trees

1. Introduction

Most natural / artificial dynamic phenomena are endowed with a nondeterministic description. Stochastic processes provide appropriate mathematical models of such phenomena. Among the class of stochastic processes, Markov chains are highly utilized for many dynamic phenomena because of demonstration of equilibrium behavior. Efficient computation of equilibrium / transient probability distribution of a Discrete Time Markov Chain (DTMC) / Continuous Time Markov Chain (CTMC) is considered to be an interesting research problem. A Markov chain on Ω is a stochastic process $\{X_0, X_1 \dots, X_t \dots\}$ with each $X_i \in \Omega$ such that $Pr(X_{t_1} = y/X_t = x, X_{t-1} = x_{t-1}, \dots, X_0 = x_0) =$

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