LIFE PERIOD ESTIMATION BY CELLULAR AUTOMATION IN CYCLE GRAPHS

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Abstract

Cellular automata have a configuration consisting of cells which may become a state "live (infected)" and "dead (non-infected)", and a configuration evolves according to some rules with respect to time. Cellular automata also have been used for simulations of spreading some disease. We often have difficulty to estimate the evolution of configurations. In this manuscript, we focus on a cycle graph with $2^k (k > 1)$ cells and 1D cellular automaton rule 90. We first show that any initial configuration becomes a null configuration which consists of all "non-infected" cells with a time period of a finite number. Furthermore, some theorems give an estimation for the time period of an initial configuration until the null configuration by the position of the cells without any simulation or numerical computations.

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