

Moran process is a model used in evolutionary dynamics to study natural selection. In this process, a population of individuals evolves in steps. In one step a random individual is selected with probability proportional to its fitness and spreads to its randomly selected neighbor. The classical course of study is to consider an individual with a hereditary mutation and examine the fate of this mutation in time.

This thesis investigates a modified version of the Moran process that corresponds to the strong selection, as in the dynamics of invasive species. In this process, only the mutant individuals spread and eventually conquer the whole population. The key quantity that we study is the so-called fixation time, which is the expected time until all individuals become mutants.

We give tight upper and lower bounds for fixation time on a general population structure and refine them for some classes. Additionally, we compute the precise fixation times on some specific population structures.