

The thesis is devoted to finding robust non-conflict paths in multi-agent path finding (MAPF). We propose several new techniques for the construction of these types of paths and describe their properties. We deal with the use of contingency planning and we create a tree plan for the agents where the specific path is chosen by the agents during the execution based on the current delay. Next we present an algorithm that increases robustness while maintaining the original length of the solution and we combine it with the previous approach. Then we will focus on the method of increasing robustness by changing the speed of agents. Finally we experimentally verify the applicability of these techniques on different types of graphs. We will show that all the proposed methods are significantly more robust than the classic solution and they also have certain advantages over previously known constructions of robust plans.