

Constraint satisfaction problems (CSPs) are a type of combinatorial (optimization) problems that invite much interest in many practical applications. CSP is defined by a set of variables, to which values must be assigned, and a set of constraints that restrict these assignments. Since many problems of practical interest require a dynamic environment, the model of CSP was extended to a dynamic CSP (DCSP), in which the set of variables and/or constraints can be modified during the constraint resolution process. To simplify the constraint satisfaction problem for search algorithms, consistency (filtering) techniques like arc-consistency are usually applied. In this thesis, we study the problem of maintaining arc-consistency in DCSPs. We propose several new dynamic arc-consistency algorithms that yield a better compromise between time and space in comparison to similar existing algorithms like DNAC-4, DNAC-6 and AC|DC. The highlight of the work is a new algorithm that outperforms so far fastest algorithm for maintaining arc consistency in dynamic problems DNAC-6. In order to do performance experiments we have developed a library SPlan written in C++. This library solves DCSPs and the new algorithms as like as the comparable existing ones are implemented as a part of the library. Experimental results on randomly generated DCSPs demonstrate the practical efficiency of our new algorithms.