論文の内容の要旨

論文題目　Diversification Mechanisms for Best-First Search
　　　　　(最良優先探索のための探索非局在化手法)
氏名　　　浅井 政太郎

　　　Despite the recent advances in domain-independent planning algorithms, there is still a large gap between the theory and practice of search algorithms for planning. In cost-optimal search, despite the major advances in lower bound functions (heuristic functions), the study of the base algorithm itself is rarely attempted recently. State-of-the-art satisficing search algorithms use complex combinations of various, ad-hoc search enhancements, making the resulting algorithm difficult to analyze. The relation between search algorithms guaranteed to find the optimal solution and satisficing search technique has also not been investigated in depth. This dissertation proposes a unified framework for understanding these algorithms, based upon which several new algorithmic enhancements are proposed to improve the state of the art.

　　　We first analyze and improve the tiebreaking behavior of A*, the standard algorithm for cost-optimal search. We develop a new framework for viewing cost-optimal search as a series of satisficing search episodes, and show that this new perspective can be effectively exploited by new tie-breaking strategies which significantly improve upon standard tie-breaking strategies.

　　　Having established effective satisficing search as a key component of cost-optimal search, we then focus on methods for improving satisficing search. We unify previous approaches for diversitying satisfying search as instances of orthogonal, inter- and intra-plateau diversification. We show that this new perspective leads to effective, new combinations of diversification strategies which improve upon the state-of-the-art diversifciation strategies. We also propose Invasion Percolation, a new fractal-inspired diversification method which complements previous diversification approaches.