

[チュートリアル講演]
Algorithm Aspect of Graph Minor Theory

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Abstract We shall survey recent progress on algorithm aspect of graph minor theory. One of the main results on Graph Minor Project by Robertson and Seymour is the following. Given a graph G and p pairs of vertices of G for fixed p , there is a polynomial time (actually $O(n^3)$) algorithm to decide if there are p mutually disjoint paths of G linking the pair. If p is part of the input of the problem, then this is one of Karp's NP-complete problems, and it remains NP-complete even for planar graphs. We shall first sketch the algorithm, and explain why the correctness needs ≥ 500 pages to prove. Then we shall focus on applications of this result. Topics include tree-width for planar graphs, 2-path problem (2-linked graph), the odd disjoint cycles, the parity paths problems, Kuratowski's theorem for general surface, nearly- k -bipartite graph problem and algorithm aspect of Hadwiger's conjecture.

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