Determinant Sums for Hamiltonicity

Andreas Björklund

Department of Computer Science, Lund University, Lund, Sweden
andreas.bjorklund@cs.lth.se

Abstract

The best worst case guarantee algorithm to see if a graph has a Hamiltonian cycle, a closed tour visiting every vertex exactly once, for a long time was based on dynamic programming over all the vertex subsets of the graph. In this talk we will show some algebraic techniques that can be used to see if a graph has a Hamiltonian cycle much faster. These techniques utilize sums over determinants of matrices.

In particular we will show how you can find out if an undirected graph has a Hamiltonian cycle much faster, but we will also talk about some partial results for the directed case and modular counting.

1998 ACM Subject Classification G.2.2 Graph Algorithms, I.1.2 Analysis of Algorithms

Keywords and phrases Hamiltonian cycle, exact algorithm, matrix determinant, algebraic techniques

Digital Object Identifier 10.4230/LIPIcs.IPEC.2016.1

Category Invited Talk

11th International Symposium on Parameterized and Exact Computation (IPEC 2016).
Editors: Jiong Guo and Danny Hermelin; Article No. 1; pp. 1:1–1:1

Leibniz International Proceedings in Informatics
Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Dagstuhl Publishing, Germany