Eades, Peter; Hong, Seok-Hee; Katoh, Naoki; Liotta, Giuseppe; Schweitzer, Pascal; Suzuki, Yusuke

Testing maximal 1-planarity of graphs with a rotation system in linear time (extended abstract). (English) [Zbl 1377.68172]


Summary: A 1-planar graph is a graph that can be embedded in the plane with at most one crossing per edge. It is known that testing 1-planarity of a graph is NP-complete. A 1-planar embedding of a graph $G$ is maximal if no edge can be added without violating the 1-planarity of $G$. In this paper we show that the problem of testing maximal 1-planarity of a graph $G$ can be solved in linear time, if a rotation system (i.e., the circular ordering of edges for each vertex) is given. We also prove that there is at most one maximal 1-planar embedding of $G$ that preserves the given rotation system, and our algorithm produces such an embedding in linear time, if it exists.

For the entire collection see [Zbl 1258.68009].

MSC:

- 68R10 Graph theory (including graph drawing) in computer science (Cited in 6 Documents)
- 05C62 Graph representations (geometric and intersection representations, etc.)
- 05C85 Graph algorithms (graph-theoretic aspects)
- 68Q25 Analysis of algorithms and problem complexity

Full Text: DOI