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

A linear-time algorithm for testing outer-1-planarity. (English) Zbl 1319.68158 Algorithmica 72, No. 4, 1033-1054 (2015).

Summary: A graph is 1-planar if it can be embedded in the plane with at most one crossing per edge. It is known that the problem of testing 1-planarity of a graph is NP-complete. In this paper, we study outer-1-planar graphs. A graph is outer-1-planar if it has an embedding in which every vertex is on the outer face and each edge has at most one crossing. We present a linear time algorithm to test whether a given graph is outer-1-planar. The algorithm can be used to produce an outer-1-planar embedding in linear time if it exists.

MSC: 68R10 Graph theory (including graph drawing) in computer science 05C10 Planar graphs; geometric and topological aspects of graph theory 05C85 Graph algorithms (graph-theoretic aspects)

Keywords: graph drawing; 1-planar graphs; outer 1-planar graphs; 1-planarity; 1-planar embedding

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