A worst-case efficient algorithm for hidden-line elimination. (English) Zbl 0655.68047

Summary: Many practical algorithms for hidden-line and surface elimination in a 2-dimensional projection of a 3-dimensional scene have been proposed. However surprisingly little theoretical analysis of the algorithms has been carried out. Indeed no non-trivial lower bounds for the problem are known. We present a plane-sweep-based hidden-line-elimination algorithm for 2-dimensional projections of scenes consisting of arbitrary polyhedra. It requires, in the worst case, $O(n \log n)$ space and $O((n + k) \log 2 n)$ time, where $n$ is the number of edges in the 3-dimensional scene, and $k$ is the number of edge intersections in the specific projection.

MSC:
68Q25 Analysis of algorithms and problem complexity
68U99 Computing methodologies and applications

Keywords:
computational geometry; worst case analysis; computer graphics; display algorithms; hidden-line-elimination

Full Text: DOI

References:

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