

Separator theorem for planar graphs

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Given a graph $G = (V, E)$ a separator $S \subset V$ such that, removing S from V disconnects the graph G . One of the basic separator theorems was by Lipton and Tarjan [1]. In their own words, the statement of the theorem is:

“Let G be any n -vertex planar graph. We prove that the vertices of G can be partitioned into three sets A, B, C such that no edge joins a vertex in A with a vertex in B , neither A nor B contains more than $2n/3$ vertices, and C contains no more than $2\sqrt{2}\sqrt{n}$ vertices. We exhibit an algorithm which finds such a partition A, B, C in $O(n)$ time.”

In this talk I will go over this theorem, which is typically used to design divide-and-conquer algorithms for hard graph problems such as graph compression.

References

- [1] Richard J. Lipton and Robert E. Tarjan. A separator theorem for planar graphs. *SIAM Journal on Applied Mathematics*, 36(2):177–189, 1979.