PLANE TRIANGULATIONS WITHOUT SPANNING 2-TREES

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A 2-tree is a graph that can be formed by starting with a triangle and iterating the operation of making a new vertex adjacent to two adjacent vertices of the existing graph. Leizhen Cai asked in 1995 whether every maximal planar graph contains a spanning 2-tree. We answer this question in the negative by constructing an infinite class of maximal planar graphs that have no spanning 2-tree. We also show that the largest spanning tree may have an arbitrarily small fraction of all vertices and find some criteria that guarantee a spanning 2-tree.

References

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