Edge-decompositions of graphs into copies of a tree

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Thomassen [3] proved that every 171-edge-connected graph has a P_4-decomposition. The proof consists of three ingredients. In principle, the method can be applied to any tree T. Barát and Thomassen [1] conjectured the following.

> For each tree T, there exists a natural number k_T such that the following holds: if G is a k_T-edge-connected graph and $|E(T)|$ divides $|E(G)|$, then G has a T-decomposition.

We report on some progress in direction of the above conjecture. In particular, we prove it for a specific tree with four edges. We also indicate that our method should be possible to generalize for an infinite class.

Barát and Thomassen [1] also conjectured that every 4-edge-connected planar graph admits a $K_{1,3}$-decomposition. It turned out to be false in the strict sense. Lai [2] constructed a class of counterexamples, and proved that 5-connectivity is the correct assumption. In the case of bipartite planar graphs, we show a 3-edge-connected example without a $K_{1,3}$-decomposition. It remains to decide whether every 4-edge-connected bipartite planar graph has a $K_{1,3}$-decomposition.

This is joint work with Dániel Gerbner (Rényi Institute, Budapest).

References

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