Institut für Optimierung und Diskrete Mathematik

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Even cycle decompositions of graphs with no odd-K_4-minor

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An even cycle decomposition of a graph G is a partition of E(G) into cycles of even length. Evidently, every Eulerian bipartite graph has an even cycle decomposition. Seymour [circuits in planar graphs. J. Combin. Theory Ser. B, 31(3):327–338, 1981] proved that every 2-connected loopless Eulerian planar graph with an even number of edges also admits an even cycle decomposition. Later, Zhang [On even circuit decompositions of Eulerian graphs. J. Graph Theory, 18(1):51–57, 1994] generalized this to graphs with no K_5-minor. We propose a conjecture involving signed graphs which contains all of these results. Our main result is a weakened form of this conjecture. Namely, we prove that every 2-connected loopless Eulerian odd-K_4-minor free signed graph with an even number of odd edges has an even cycle decomposition. This is a joint work with Tony Huynh and Maryam Verdian-Rizi.

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