

Cosupereulerian graphs

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Abstract:

A subset S of a matroid M is eulerian if S is a disjoint union of circuits.

A matroid with an eulerian subset spanning in M is supereulerian, and a connected graph G is supereulerian if its cycle matroid $M(G)$ is supereulerian. A graph G is cosupereulerian if its cocycle matroid $M^*(G)$ is supereulerian. In [J. of Graph Theory, 664 (2010), 1-11], it is proved that every 3-edge-connected graph with circumference at most 8 is supereulerian. This result can be improved to the form that every 3-edge-connected graph G with circumference at most 9 is supereulerian if and only if G does not have a block isomorphic to the Petersen graph. We introduce cosupereulerian reductions of graphs in the sense that a graph G is cosupereulerian if and only if its cosupereulerian reduction is cosupereulerian; and determine a finite family F of non cosupereulerian graphs such that any simple graph G with every bond size at most 9 is cosupereulerian if and only if its cosupereulerian reduction has a block lying in F .