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SHORT CYCLE COVERS OF CUBIC GRAPHS

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A cycle cover of a graph G is a collection of cycles in G such that every edge from $E(G)$ is contained in at least one of the cycles. Long open conjecture by Alon and Tarsi states that every bridgeless graph on m edges has a cycle cover of length at most $1.4m$. The best known general result for bridgeless graphs is a cycle cover of total length at most $5m/3$ [Alon and Tarsi 1985; Bermond, Jackson, and Jaeger 1983]. The nowhere zero 5-flow conjecture implies existence of a cycle cover of length at most $1.6m$ [Jamshy, Raspaud, and Tarsi 1987]. The best result for bridgeless cubic graphs up to date is by Kaiser et al. (2010) giving a cycle cover of length at most $34m/21 \approx 1.619m$. We show that a bridgeless cubic graph G with m edges has a cycle cover of length at most $1.6m$. If G contains no circuits of length 5, then it has a cycle cover of length at most $14/9 \cdot m \approx 1.556m$.