Generalized spectral characterizations of Eulerian graphs: revisited

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Let G be an Eulerian graph on n vertices with adjacency matrix A and characteristic polynomial $\phi(x)$. We show that when n is even (resp. odd), the square-root of $\phi(x)$ (resp. $x\phi(x)$) is an annihilating polynomial of A, over $\mathbb{F}_2$. The result was achieved by applying the Jordan canonical form of A over the algebraic closure $\bar{\mathbb{F}}_2$. Based on this, we show that a family of Eulerian graphs are determined by their generalized spectrum among all Eulerian graphs, which significantly simplifies and strengthens the previous result. This is a joint work with Kunyue Li and Hao Zhang.