The Laplacians, Kirchhoff index and complexity of linear Möbius and cylinder octagonal-quadrilateral networks

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Abstract

Spectrum graph theory not only facilitate comprehensively reflflect the topological structure and dynamic characteristics of networks, but also offer signifificant and noteworthy applications in theoretical chemistry, network science and other fifields. Let Ln (8, 4) represent a linear octagonal-quadrilateral network, consisting of n eight-member ring and n four-member ring. The M¨obius graph Qn(8, 4) is constructed by reverse identifying the opposite edges, whereas cylinder graph Q'n (8, 4) identififies the opposite edges by order. In this paper, the explicit formulas of Kirchhoffff indices and complexity of Qn(8, 4) and Q'n (8, 4) are demonstrated by Laplacian characteristic polynomials according to decomposition theorem and Vieta's theorem. In surprise, the Kirchhoffff index of Qn(8, 4)(Q'n (8, 4)) is approximately one-third half of its Wiener index as n - [?].

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