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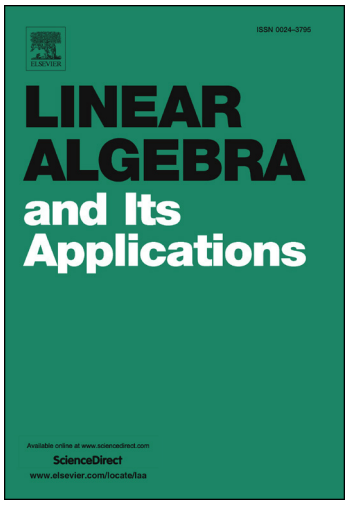

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Solution to a problem on skew spectral radii of oriented graphs*

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Abstract

Let G be a simple graph, and let G^σ be an oriented graph of G with skew adjacency matrix $S(G^\sigma)$. The skew spectral radius $\rho_s(G^\sigma)$ of G^σ is defined as the spectral radius of $S(G^\sigma)$. When G is an odd-cycle graph (no even cycle), Cavers et al. [Linear Algebra Appl. 436(12):4512-1829, 2012] showed that the skew spectral radius of G^σ is the same for every orientation σ of G. They proposed a problem: If G is a connected graph and $\rho_s(G^\sigma)$ is the same for all orientations σ of G, must G be an odd-cycle graph? In this paper, we solve this problem and give a positive answer.

Keywords: odd-cycle graph, skew characteristic polynomial, skew spectral radius, matching polynomial

AMS Subject Classification 2010: 05C20, 05C50, 05C90

1 Introduction

The spectral radius of a graph is an important subject in spectral graph theory, and has been studied extensively, for more detail see [3, 17]. Recently, the skew spectral radii of oriented graphs have attracted many researchers [1, 2, 4–7, 13, 14, 16].

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