

On chromatic uniqueness of certain 5-partite graphs

H. Roslan · A.S. Ameen · Y.H. Peng · H.X. Zhao

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Abstract Let $P(G, \lambda)$ be the chromatic polynomial of a graph G . Two graphs G and H are said to be chromatically equivalent, denoted $G \sim H$, if $P(G, \lambda) = P(H, \lambda)$. We write $[G] = \{H \mid H \sim G\}$. If $[G] = \{G\}$, then G is said to be chromatically unique. In this paper, we first characterize certain complete 5-partite graphs with $5n + 3$ vertices according to the number of 6-independent partitions of G . Using these results, we investigate the chromaticity of G with certain star or matching deleted. As a by-product, many new families of chromatically unique complete 5-partite graphs with certain star or matching deleted are obtained.

Keywords Chromatic polynomial · Chromatically closed · Chromatic uniqueness

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1 Introduction

All graphs considered here are simple and finite. For a graph G , let $P(G, \lambda)$ be the chromatic polynomial of G . Two graphs G and H are said to be *chromatically equivalent* (or simply χ -equivalent), symbolically $G \sim H$, if $P(G, \lambda) = P(H, \lambda)$. The equivalence class determined by G under \sim is denoted by $[G]$. A graph G is *chromatically unique* (or simply χ -unique) if $H \cong G$ whenever $H \sim G$, i.e., $[G] = \{G\}$

H. Roslan (✉) · A.S. Ameen
School of Mathematical Sciences, University Sains Malaysia, 11800 Penang, Malaysia
e-mail: hroslan@cs.usm.my

Y.H. Peng
Department of Mathematics, and Institute for Mathematical Research, University Putra Malaysia,
43400UPM Serdang, Malaysia

H.X. Zhao
Department of Mathematics, Qinghai Normal University, Xining, Qinghai 810008, China