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Chromatic Harmonic Indices and Chromatic Harmonic Polynomials of Certain Graphs

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Abstract. In the main this paper introduces the concept of chromatic harmonic polynomials denoted, $H^x(G,x)$ and chromatic harmonic indices denoted, $H^x(G)$ of a graph G. The new concept is then applied to finding explicit formula for the minimum (maximum) chromatic harmonic polynomials and the minimum (maximum) chromatic harmonic index of certain graphs. It is also applied to split graphs and certain derivative split graphs.

Keywords: Chromatic harmonic index, Chromatic harmonic polynomial, Split graph, Derivative split graph.

2000 Mathematics Subject Classification: 05C15, 05C38, 05C75, 05C85.

1. Introduction

For general notation and concepts in graphs and digraphs see [1] [7]. Unless mentioned otherwise all graphs are simple, connected and undirected graphs. In this article a graph G will have order $n \geq 2$ with vertex set $V(G) = \{v_1, v_2, v_3, \ldots, v_n\}$ and size $p \geq 1$ with edge set $E(G) = \{e_1, e_2, e_3, \ldots, e_p\}$,

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