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# Neighbor sum distinguishing $[k]$ -edge colorings \*

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## Abstract

A proper  $[k]$ -edge coloring of a graph  $G$  is a proper edge coloring of  $G$  using colors of the set  $[k] = \{1, \dots, k\}$ . A neighbor sums distinguishing  $[k]$ -edge coloring of  $G$  is a proper  $[k]$ -edge coloring of  $G$  such that for any pair of adjacent vertices  $x$  and  $y$  the sum of colors taken on the edges incident to  $x$  is different from the sum of colors taken on the edges incident to  $y$ . The smallest number of colors in such a coloring of  $G$  is denoted by  $\text{ndi}_{\Sigma}(G)$ . In the paper we conjecture that for any graph  $G \notin \{K_2, C_5\}$  with maximum degree  $\Delta(G)$  we have  $\text{ndi}_{\Sigma}(G) \leq \Delta(G) + 2$ . We prove this conjecture for several classes of graphs. We also show that  $\text{ndi}_{\Sigma}(G) \leq 7\Delta(G)/2$  for any graph  $G$  with  $\Delta(G) \geq 2$  and  $\text{ndi}_{\Sigma}(G) \leq 8$  if  $G$  is cubic.

**Keywords:** proper edge coloring, neighbor-distinguishing index, neighbor sum distinguishing coloring, chromatic index.

**Mathematics Subject Classification:** 05C15.

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