

Local Irregularity Conjecture vs. cacti

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Abstract. A locally irregular graph is a graph in which the end-vertices of every edge have distinct degrees. An edge coloring of a graph G is locally irregular if each of the colors induces a locally irregular subgraph of G . A graph G is colorable if it admits a locally irregular edge coloring. The Local Irregularity Conjecture claims that all graphs, except odd length paths, odd length cycles and a certain class of cacti, are colorable by 3 colors. We establish that the conjecture holds for unicyclic graphs and cacti with vertex disjoint cycles. We further provide a bow-tie graph B , which is a colorable cactus graph in which cycles are not vertex disjoint, for which the conjecture does not hold. Since all graphs which are not colorable are cacti and the only known counterexample to the conjecture is a cactus graph, the cacti seem to be a relevant class of graphs for this conjecture. We finish our considerations by establishing that the bow-tie graph is the only counterexample for the conjecture in the class of cacti.