

## 2-Tone Coloring and Petersen Covers

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A 2-tone coloring of a graph assigns two colors to each vertex of a graph so that adjacent vertices have no common colors and vertices at distance two have at most one common color. The 2-tone chromatic number of a graph is the minimum number of colors in any 2-tone coloring. It is not too difficult to determine the 2-tone chromatic number of many basic classes of graphs, including trees, cycles, and wheels.

The labeling that defines the Petersen graph is a 2-tone coloring. Cubic graphs that are 2-tone 5-colorable are equivalent to graph covers of the Petersen graph. There is a simple operation characterization of Petersen covers. Properties of Petersen covers including connectivity and girth can be analyzed.