

Extremal vertex colorings of graphs

John Engbers*, Marquette University

For graphs G and H , an H -coloring of G is an adjacency preserving map from the vertices of G to the vertices of H . The graph H can be thought of as having its vertices being the colors used and its edges indicating colors that can appear on the endpoints of an edge in G . When the graph H is the complete graph K_q , an H -coloring corresponds to a proper vertex coloring of G with q colors; when H is an edge with one looped endvertex, an H -coloring corresponds to an independent set in G .

Given a family of graphs, which graph in the family has the most number of H -colorings, and which has the least number of H -colorings? We will discuss some things that are known in a variety of families, including trees and graphs with a fixed minimum degree.

Keywords: vertex colorings, graph homomorphisms