Notes on the Villainy of a Graph

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Given a simple graph G on n vertices, and given a proper colouring of G using k = ÷(G) colours, written as an n-vector v, we consider the set S(v,G) of n-vectors which are permutations of v. For each element u of S(v,G), we define the villainy of u with respect to G, denoted b(u,G), to be the minimum number of components of u that must be permuted so that the resulting n-vector again represents a proper colouring of G. Then let S(G) = S(v,G), where the union is taken over all proper colourings v, and define the Villainy of G, denoted B(G), as the supremum over S(G) of b(u,G).