Colourings of $(0, m)$-graphs and the switching operation

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Let G be a $(0, m)$-graph, that is, a graph with m edge sets $E_1, E_2, \ldots, E_m$. We consider vertex colourings of these graphs in which adjacent vertices are assigned different colours and the edge sets are respected in the sense that each pair of colours appears on the ends of edges in at most one set E_i. Given a group Γ_m of permutations of $\{1, 2, \ldots, m\}$, the operation of switching at a vertex x with respect to $\pi \in \Gamma_m$ permutes the sets to which the edges incident with x belong according to π. We will consider the effect of switching on the minimum number of colours needed for various choices of Γ_m, in particular when it is Abelian, when it is the symmetric group, when it is the alternating group, and when it is the dihedral group.