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Switchable 2-Colouring is Polynomial

Let G be a (m, n) -mixed graph, Γ be a permutation group acting on the colours of G , and $\pi \in \Gamma$ be a permutation. We define *switching a vertex v* with respect to π as applying π on the colour of each edge incident to v and on the colour and direction of each arc incident to v .

Given an (m, n) -mixed graph G , we study of the question “Is there a sequence of switchings so that the resulting (m, n) -mixed graph admits a homomorphism to a 2-vertex target?”

We show that this problem is polynomial for all Γ .