On the Chromatic Spectrum of Graph Decompositions

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Abstract

Let the edges a graph H be decomposed (partitioned) into copies isomorphic to graphs in $\mathcal{G} = G_1, G_2 \cdots G_n$. Form a new graph whose vertices are the copies and there is an edge if the copies have a vertex of H in common. This number is called, in analogy to edge colouring in which $\mathcal{G} = K_2$, $\chi'_{\mathcal{G}}(H)$.

$n \in Spec'_{\mathcal{G}}(H) \Leftrightarrow$ there is a decomposition of H with $\chi'_{\mathcal{G}}(H) = n$

We investigate when $Spec'_{\mathcal{G}}(H)$ is not single valued and when it is not an interval.