Reconfiguration of Vertex Colourings in Hereditary Classes of Graphs

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The reconfiguration graph of the k-colourings, denoted $R_k(G)$, is the graph whose vertices are the k-colourings of G, and two colourings are adjacent in $R_k(G)$ if they differ in colour on exactly one vertex. We are interested in whether the reconfiguration graph is connected, and if so, its diameter. Being connected means we can obtain any k-colouring from any other by changing the colour of one vertex at a time, while always having a k-colouring.

We call a graph recolourable if $R_k(G)$ is connected for every k bigger than the chromatic number of G. We have characterized the graphs H such that all graphs G which don't have H as an induced subgraph are recolourable. We have done the same for other hereditary graph classes including when two 4-vertex graphs are excluded as induced subgraphs.

We also explore graph decompositions applied to recolouring.

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