

Existence of digraphs with specified minimum and maximum number of colors in acyclic colorings

Mika Olsen

Universidad Autónoma Metropolitana. Cuajimalpa

The chromatic number and the acromatic number refer to the minimum and maximum number of colors in a proper coloring of G . Proper colorings have been extended in various ways to digraphs. In this talk, we focus on acyclic colorings, where the dicromatic number and the diacromatic number represent the minimum and maximum number of colors in an acyclic coloring of D . A classic result for graphs is that for any pair of numbers $a \leq b$, there exists a graph with chromatic number a and acromatic number b . Using this construction and replacing each edge with a symmetric edge, it is immediate that this result is preserved for symmetric graphs. But what happens when the digraph is not symmetric? We define a construction that allows us to prove the result for non-symmetric graphs. These digraphs have symmetric arcs. In the case of asymmetric digraphs, we only have a partial result and suspect that there may not even exist an asymmetric digraph with both the dicromatic number and diacromatic number equal to 3.

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