

Coloring Properties of Mixed Cycloids

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In this paper we investigate partitions of highly symmetrical discrete structures called cycloids. A mixed cycloid is a hypergraph whose vertices can be arranged in a cyclic order and every consecutive p vertices form a C -edge, and every consecutive q vertices form a D -edge in the ordering. The vertices are colored in such a way that each C -edge has two vertices of the same color, and each D -edge has two vertices of distinct colors. We completely determine the maximum number of colors that can be used for any $p \geq 3$ and any $q \geq 2$. We also develop an algorithm which generates a coloring with any number of colors between the minimum and maximum. Finally, we discuss the colorings of mixed cycloids when the maximum number of colors coincides with its upper bound which is the largest cardinality of a set of vertices containing no C -edge.