The Cycle Compelling Number of Graph

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We introduce the cycle compelling number of a graph as the minimum number of colors in a proper coloring of the vertices such that if one takes one vertex of each color the resultant subgraph always contains a cycle. This parameter is related to the dominator and total dominator chromatic numbers of a graph. We observe that the parameter is at least both the chromatic number and the girth of the graph and at most the sum of these two numbers, and show that these bounds can be attained. We characterize graphs where the parameter is 3, and investigate families of graphs such as cubic graphs and disjoint union of cliques.

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