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Chromatic vertex Folkman numbers, general Folkman problems, and related computational challenges

Graph G (vertex/edge)-arrows graphs $H_1, \ldots, H_k$ if every k-coloring of its (vertices/edges) contains a monochromatic copy of H_i, in some color i. A branch of Ramsey theory concerning properties of this arrowing for F-free G, for some graphs F, leads to Folkman-type problems and numbers. Graph G sometimes meets exactly the best bound on its chromatic number. We present some results on the existence of such graphs and related bounds on Folkman numbers, which often lead to computational challenges. We also summarize what was accomplished computationally, and what not, for similar but more general Folkman problems.