

The Down Arrow Ramsey Set

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In traditional Ramsey Theory, we ask the question: Given two graphs F and H , what is the smallest positive integer n such that every red-blue coloring of K_n results in a red F or a blue H ? We can ask this same question about colorings of graphs G which are not necessarily complete. A graph G is said to *arrow* the graphs F and H , written $G \rightarrow (F, H)$, if every red-blue coloring of G results in a red F or a blue H . In this case, the primary question has been determining graphs G for which $G \rightarrow (F, H)$. If we consider the version for which $F = H$, then we can ask a different question: Given a graph G , can we determine all graphs F such that $G \rightarrow (F, F)$, or simply $G \rightarrow F$? We call this set of graphs the *down arrow Ramsey set of G* , or $\downarrow G$. In this talk, we will discuss classes of graphs for which we have determined the down arrow Ramsey set, using methods of Ramsey Theory and through the lens of graph ideals.

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