Combinatorics
Job Talk

Bounding the Chromatic Number and Average Degree of Graphs

Rose McCarty, Instructor and NSF Postdoctoral
Princeton University

Abstract: When can we partition the vertex set of a graph into a few parts so that, within each part, there are no adjacent vertices? One obvious obstruction is the existence of many pairwise adjacent vertices. A class of graphs is called χ-bounded if this is the only obstruction. We introduce this topic by considering classes of graphs with geometric representations. Then we move on to the general case. While it was recently shown that χ-bounding functions can be arbitrarily bad, we prove that "average degree bounding functions" are actually well-behaved. This proof suggests a new approach to the 1983 conjecture of Thomassen about average degree and girth.

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Mathematics
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