On fractional chromatic number and its approximations

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In fractional coloring, we color vertices of a graph by sets of measure one subject to the constraint that adjacent vertices receive disjoint sets, and we minimize the measure of the union of these sets. This is a natural generalization of the usual graph coloring, which can be viewed as a special case when the measure space is finite. Hence, fractional chromatic number can be used as a lower bound for the ordinary chromatic number. Moreover, optimal fractional coloring reveals interesting information about independent sets of the graph.

Unsurprisingly, it is hard (both from the theoretical and the computational perspective) to determine the fractional chromatic number exactly. Thus, it is natural to ask whether we can approximate it or bound it in terms of simpler graph parameters. In my talk, I will discuss recent results concerning several interpretations of this question.