

Colouring graphs of bounded local density

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Abstract:

What is the best upper bound on the chromatic number for graphs of given maximum degree Δ and given maximum local density – that is, with neighbourhood subgraphs each inducing at most a certain edge density? This Ramsey-type problem has deep roots going back more than half a century, for example, to a question of Vizing from the 1960s on triangle-free graphs, corresponding to local density 0. I will give a quick survey of the history of this question, particularly for large Δ , including discussion of some selected related problems (such as the conjecture of Erdos and Nešetřil). Then I will discuss some recent progress on this problem, with emphasis on the regime of dense (i.e. $\Theta(\Delta)$) local sparsity. This talk will touch on numerous joint works with, variously, Davies, Hurley, de Joannis de Verclos, Pirot, Sereni.