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On powers of sparse graphs

It is conjectured that if C is a class of graphs with structurally bounded expansion, then even if we do not know the underlying transduction and bounded expansion class, we can solve all first order logic problems in polynomial time on C.

A simple class of graphs with structurally bounded expansion is d-powers of minor closed classes. I'll discuss some results on this class of graphs, in particular:

1) It is NP-complete to decide if a graph G has a square root H such that H is from a minor closed class M, so long as M contains at least 6 apex vertices

2) There exists an algorithm to 2-approximate the subchromatic number of bounded layered cliquewidth (which includes powers of planar graphs)

3) The subchromatic number of squares of planar graphs is at most 43

This is joint work with subsets of: Zdenek Dvorak and Abhiruk Lahari; Pankaj Kumar, Patrice Ossona de Mendez,Pedro Cortez, and Daniel Quiorz.