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Continuous combinatorics and LOCAL algorithms

Given a class of graphs and a coloring problem, what is the optimal complexity of a solution? A descriptive set theorist reading this will insert the word 'Borel' in front of as many words as they can, while a computer scientist will interpret it as an algorithmic question about finite graphs. It turns out that they are still asking the same question (almost). My talk will give an overview of the translation between LOCAL algorithms on finite graphs and Borel solutions on infinite Borel graphs, focusing on the case of continuous solutions. For some graph classes (trees and Cayley graphs), continuous solutions are exactly equivalent to fast LOCAL algorithms. I will discuss my current research on extending this equivalence to all graph classes. If time permits (which it rarely does in a math talk), I will also talk about other open problems in this area.