

Computer Science Seminar

On Coloring Resilient Graphs

Jeremy Kun (UIC)

Abstract: We introduce a new notion of resilience for constraint satisfaction problems, with the goal of more precisely determining the boundary between NP-hardness and the existence of efficient algorithms for resilient instances. In particular, we study r -resiliently k -colorable graphs, which are those k -colorable graphs that remain k -colorable even after the addition of any r new edges. We prove lower bounds on the NP-hardness of coloring resiliently colorable graphs, and provide an algorithm that colors sufficiently resilient graphs. We also analyze the corresponding notion of resilience for k -SAT. This notion of resilience suggests an array of open questions for graph coloring and other combinatorial problems.

This work appeared in Mathematical Foundations of Computer Science, 2014 and is joint with Lev Reyzin

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