Combinatorics Seminar

Friday Nov 21st, 2014

3:00 pm-3:50 pm in Hume 331

Digraph Coloring and Forbidden Cycle

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ABSTRACT

Let k and r be two integers with $k \geq 2$ and $k > r \geq 1$. We show that (1) if a strongly connected digraph D contains no directed cycle of length 1 modulo k, then D is k-colorable; and (2) if a digraph D contains no directed cycle of length r modulo k, then D can be vertex-colored with k colors so that each color class induces an acyclic subdigraph. In addition to strengthening several classical graph coloring results (by Bondy, Erdős and Hajnal, Gyárfás, etc), our results give an affirmative answer to a question of Tuza in 1992 and imply a strong form of a conjecture of Diwan, Kenkre and Vishwanathan: If graph G contains no cycle of length r modulo k, then G is k-colorable if $r \neq 2$ and $(k + 1)$-colorable otherwise. In this talk, we will also discuss other related results and mention sereval open problems (both graph theoretic and algorithmic).

Joint work with Zhibin Chen and Wenan Zang.