Department of Applied and Computational Mathematics and Statistics Colloquium

Guantao Chen

Department of Mathematics & Statistics

Georgia State University

THE GOLDBERG-SEYMOUR CONJECTURE

Given a multigraph $G = (V, E)$, the edge-coloring problem (ECP) is to color the edges of G with the minimum number of colors so that no two adjacent edges have the same color. This problem can be naturally formulated as an integer program, and its linear programming relaxation is called the fractional edge-coloring problem (FECP). In the literature, the optimal value of ECP (resp. FECP) is called the chromatic index (resp. fractional chromatic index) of G, denoted by $\chi'(G)$ (resp. $\chi'_f(G)$). Let $\Delta(G)$ be the maximum degree of G and let $\omega(G) = \max_{H \subset G, |V(H)| \geq 3} \frac{|E(H)|}{\lfloor |V(H)|/2 \rfloor}$. Clearly, $\max\{\Delta(G), \lceil \omega(G) \rceil\}$ is a lower bound for $\chi'(G)$. As shown by Seymour, $\chi'_f(G) = \max\{\Delta(G); \omega(G)\}$. In the 1970s Goldberg and Seymour independently conjectured that $\chi'(G) = \max\{\Delta(G) + 1, \lceil \omega(G) \rceil\}$. Over the past four decades this conjecture, a cornerstone in modern edge-coloring, has been a subject of extensive research, and has stimulated a significant body of work. I will report the proof of this conjecture and problems surrounding this conjecture.

Monday, April 1, 2019

4:35 PM – 5:35 PM

127 Hayes-Healy Center

Colloquium Tea 4:05 PM to 4:35 PM 101A Crowley Commons Room