

# Discrete Mathematics Seminar

Illinois State University

2:00–2:50 pm, September 17

Speaker: Guantao Chen, Georgia State University

## Graph Edge Coloring

Graph edge coloring is a well established subject in the field of graph theory, it is one of the basic combinatorial optimization problems: color the edges of a *graph*  $G$  with as few colors as possible such that each edge receives a color and *adjacent edges*, that is, different edges incident to a common vertex, receive different colors. The minimum number of colors needed for such a coloring of  $G$  is called the *chromatic index* of  $G$ , written  $\chi(G)$ . By a result of Holyer, the determination of the chromatic index is an *NP-hard* optimization problem. The *NP-hardness* gives rise to the necessity of using heuristic algorithms. In particular, we are interested in upper bounds for the chromatic index that can be efficiently realized by a coloring algorithm. In this talk, we will start with the well-known Goldberg-Seymour conjecture and its proof, then talk about the recent development of recoloring techniques and its applications to a number of classic problems in critical class 2 simple graphs.

