

# Discrete Mathematics Seminar

Illinois State University

2:00–2:50 pm, February 18

Speaker: Songling Shan, Illinois State University

## Overfullness of critical class 2 graphs with a small core degree

Let  $G$  be a simple graph, and let  $n$ ,  $\Delta(G)$  and  $\chi'(G)$  be the order, the maximum degree and the chromatic index of  $G$ , respectively. We call  $G$  *overfull* if  $|E(G)|/\lfloor n/2 \rfloor > \Delta(G)$ , and *critical* if  $\chi'(H) < \chi'(G)$  for every proper subgraph  $H$  of  $G$ . Clearly, if  $G$  is overfull then  $\chi'(G) = \Delta(G) + 1$ , implying that  $G$  is a class 2 graph. The *core* of  $G$ , denoted by  $G_\Delta$ , is the subgraph of  $G$  induced by all its maximum degree vertices. Hilton and Zhao conjectured that for any critical class 2 graph  $G$  with  $\Delta(G) \geq 4$ , if the maximum degree of  $G_\Delta$  is at most two, then  $G$  is overfull, which in turn gives  $\Delta(G) > n/2 + 1$ . We show that for any critical class 2 graph  $G$ , if the minimum degree of  $G_\Delta$  is at most two and  $\Delta(G) > n/2 + 1$ , then  $G$  is overfull. This is joint work with Yan Cao and Guantao Chen.

