Discrete Mathematics Seminar

Illinois State University

2:00–2:50 pm, September 3

Speaker: Zi-Xia Song, University of Central Florida

Gallai-Ramsey Numbers of Cycles

For a graph H and an integer $k \geq 1$, the k-color Ramsey number $R_k(H)$ is the least integer N such that every k-coloring of the edges of the complete graph K_N contains a monochromatic copy of H. Let C_m denote the cycle on $m \geq 4$ vertices. For odd cycles, Bondy and Erdős in 1973 conjectured that for all $k \geq 1$ and $n \geq 2$, $R_k(C_{2n+1}) = n \cdot 2^k + 1$. Recently, this conjecture has been verified to be true for all fixed k and all n sufficiently large by Jenssen and Skokan; and false for all fixed n and all k sufficiently large by Day and Johnson. Even cycles behave rather differently in this context. Little is known about the behavior of $R_k(C_{2n})$ in general. In this talk we will present our recent results on Ramsey numbers of cycles under Gallai colorings, where a Gallai coloring is a coloring of the edges of a complete graph without rainbow triangles. We prove that the aforementioned conjecture holds for all k and all n under Gallai colorings. We also completely determine the Ramsey number of even cycles under Gallai colorings.

Joint work with Dylan Bruce, Christian Bosse, Yaojun Chen, Fangfang Zhang and Jingmei Zhang.