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# Discrete Mathematics Seminar

Time:          Friday, October 21, 2022, 1:00-2:00 PM (Central Time)
Title:           N-Set Distance-Labelings for Cycle Graphs
Speaker:     Alissa Shen, St. Stephen's Episcopal School, Austin, Texas
Zoom Link:  https://txstate.zoom.us/j/99924628868?pwd=czdJWVpWOHZIZE0vbHB QL1pWell6QT09
ID: 999 2462 8868
Passcode: **753321**

Abstract:

Let $G = (V, E)$ be a graph and $C_m$ be the cycle graph with $m$ vertices. In this talk, the distance labeling of the cycle graph $C_m$ will be discussed. An $n$-set distance labeling of a graph $G$ is the labeling of the vertices (with $n$ labels per vertex) of $G$ under certain constraints, depending on the distance between each pair of the vertices in $G$. The smallest value for the largest label in an $n$-set distance labeling of $G$ is denoted by $\lambda_1^{(n)}(G)$. Previously, basic results were studied for $\lambda_1^{(2)}(C_m)$ for all $m$ and $\lambda_1^{(n)}(C_m)$ for some $m$ where $n \geq 3$. However, there were still gaps left unstudied due to case-by-case complexities. For these uncovered cases, a lower bound for $\lambda_1^{(n)}(C_m)$ will be proved. Then an algorithm will be proposed for finding an $n$-set distance labeling for $n \geq 3$ based on the proof of the lower bound. Every single case for $3 \leq n \leq 500$ will be verified by this same algorithm, which indicates that the upper bound is the same as the lower bound for all $n \leq 500$.