Non-uniform degrees and rainbow versions of the Caccetta-Häggkvist conjecture

He Guo
Technion - Israel Institute of Technology

Abstract
The famous Caccetta-Häggkvist conjecture states that for any $n$-vertex directed graph $D$, the directed girth of $D$ (the minimum length of a directed cycle in $D$) is at most $\lceil n/k \rceil$, where $k$ is the minimum out-degree of $D$. Aharoni raised a strengthening conjecture: for any $n$-vertex graph $G$ equipped with an edge coloring (not necessarily proper) using $n$ colors, the rainbow girth of $G$ (the minimum length of a cycle in $G$ with distinctly colored edges) is at most $\lceil n/k \rceil$, where $k$ is the minimum size of the color class. We will discuss some results in the non-uniform degrees and rainbow versions of the Caccetta-Häggkvist conjecture.

Based on work joint with Ron Aharoni, Eli Berger, Maria Chudnovsky, and Shira Zerbib.