Arbitrarily oriented Hamilton cycles: an extension of Dirac's theorem to digraphs

Louis DeBiasio

joint work with Nicholas Bruno, Daniela Kühn, Theo Molla, Deryk Osthus, and Amelia Taylor

Ghoulia-Houri proved that every digraph with in-degree and out-degree at least $n/2$ contains a consistently oriented Hamilton cycle. We show that for sufficiently large n, every digraph with in-degree and out-degree at least $n/2$ contains *every* orientation of a Hamilton cycle, except possibly the anti-directed one; however, in the anti-directed case we show that $n/2 + 1$ is sufficient. These results are sharp and improve the asymptotic results of Häggkvist and Thomason.

Furthermore, we will discuss a stability result for even more general structures (H-subdivisions) having arbitrary color patterns and orientations (and subdivision lengths). This will applicable to many variations of the Hamiltonian cycle problem (pancyclic, k-linked, k-ordered, H-linked, k-disjoint cycles etc.) in graphs, digraphs, colored multigraphs, etc.

debiasld@miamioh.edu

Miami University, Oxford, OH