ALICE LACAZE-MASMONTEIL, University of Ottawa

Resolvable directed cycle decompositions of the complete symmetric digraph

A $\vec{C}_m$-factorization (or resolvable $\vec{C}_m$-decomposition) of a digraph G is a decomposition of G into spanning subgraphs, each a disjoint union of directed cycles of length m. For positive integers α and m, it is conjectured that a $\vec{C}_m$-factorization of the complete symmetric digraph on αm vertices, denoted $K^*_{\alpha m}$, exists if and only if $(m, \alpha) \notin \{(3, 2), (4, 1)\}$. This conjecture has been proven for $m \in \{3, 4\}$ and for the case m is even or α is odd. For $m \geqslant 5$ odd and α even, Burgess and Šajna have also shown that it suffices to find a $\vec{C}_m$-factorization of K^*_{2m} to completely settle the conjecture. In this talk, we take a major step towards a resolution of this problem by showing that, if m is odd and divisible by a prime congruent to 5 modulo 6, then K^*_{2m} admits a $\vec{C}_m$-factorization. This is joint work with Mateja Šajna.