
MATTHEW SULLIVAN, University of Waterloo
Simple Drawings of K_n from Rotation Systems

A complete rotation system on n vertices is a collection consisting of the cyclic permutations of the elements $[n] \setminus \{i\}$. If D is a drawing of a labelled graph, then a rotation at vertex v is the cyclic ordering of the edges at v . In particular, the collection of all vertex rotations of a simple drawing of K_n is a rotation system. Conversely, can we characterize when a complete rotation system can be represented as a simple drawing of K_n (a.k.a. realizable)? In 2011, Jan Kynčl published a proof using homotopy implying that if all 6 vertex rotation systems of an n vertex rotation system R_n are realizable, then R_n is realizable. In this talk, we will briefly review the full characterization of realizable rotation systems and see a combinatorial proof that if rotation systems of size 10 are realizable, then the associated n vertex rotation system is realizable.