Contribution ID: **14** Type: **Presentation (25 min)**

Matroids of Symmetric Rigid Frameworks

Friday, 23 August 2024 12:05 (25 minutes)

A 2-dimensional framework (G, p) is an embedding of a graph $G = (V, E)$ into 2-dimensional space, such that each vertex v is assigned a pair of coordinates $p(v) = (x_v, y_v) \in \mathbb{R}^2$. A framework is rigid if the only motions of the vertices in the plane that preserve all edge lengths are isometries of the plane. It is well-known (since at least the 1920s) that when the set of coordinates $p(V)$ are algebraically independent over $\mathbb{Q}$, then the rigidity of the framework is determined by the rank of the rigidity matroid of the graph.

However, real-life structures are typically not generic, and often exhibit symmetry. In the last 30 years there has been a lot of research into extending the definition of the rigidity matroid to different symmetry groups. Many of these results first model the framework as a group-labelled graph and then define a matroid on the graph. In this talk, I'll present an approach that unifies many of these results. Unfortunately the main open problem in the area, characterising rigidity under even dihedral groups, still remains open.

Primary author: CLINCH, Katie (UNSW Sydney)

Presenter: CLINCH, Katie (UNSW Sydney)