Department of Mathematics and Statistics Colloquium

Varieties, Orbit Spaces, and the Heisenberg Group H_3

Andre Mas

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Abstract: A fundamental goal in mathematics is to understanding global actions on spaces. One way this may be done is by studying the maps induced on various related structures, such as the representation variety, which is constructed from the space's fundamental group and a matrix Lie group. We will describe how this strategy is used to analyze the fixed point sets of three involutions that generate the mapping class group of a closed, connected, oriented, genus 6 surface. In the process, a case is made for the use of the 3×3 Heisenberg group in the study of representation varieties.

Efficient (j, k)-Domination on Chrysalises

William Nettles

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Abstract: Rubalcaba and Slater define an efficient (j, k)-dominating function on graph G as a function $f : V(X) \to \{0, ..., j\}$ so that for each $v \in V(X), f(N[v]) = k$, where $N[v]$ is the closed neighborhood of v (Robert R. Rubalcaba and Peter J. Slater. Efficient (j, k)-domination. Discuss. Math. Graph Theory, 27(3):409-423, 2007). For regular graph G the set of efficient dominating functions is closely related to the (1)-eigenspace of G. A 3-regular caterpillar is a tree obtained from a path by adding a pendant vertex to every vertex of degree 2. A chrysalis is a 3-regular graph constructed by adding a cycle through the leaves of a 3-regular caterpillar. We characterize the planar chrysalises that admit efficient dominating functions, as well as the values j and k for which an efficient (j, k)-dominating function can be constructed. Towards extending our characterization to all chrysalises we characterize efficient domination on a class of non-planar chrysalises.

Monday, September 6^{th} at 3:10 pm via Zoom