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G-Convexity of Graphs

A *convexity* or *alignment* on a finite set V is a collection of subsets of V containing the empty set, and the whole set V, and is closed under intersection; this forms a natural combinatorial generalization of convexity in euclidean space. Now let G be a graph of order n. A subset C of vertices of G is *g-convex* if for every pair $u, v \in C$ the vertices on every u–v geodesic (i.e. shortest u–v path) belong to C. The set of g-convex subsets of a graph are an interesting subfamily of alignments. In this talk we will discuss three aspects of g-convexity: the structure of g-minimal graphs (those that have the minimal number of g-convex sets), the complexity of counting g-convex sets in a graph, and when there exists g-convex sets of all cardinalities from 0 to n. (This research is joint with O. Oellermann.)