Fabricio Benevides. Graph convexities and maximum infection time.

Abstract. Graph convexities may be defined using the so called interval functions. In the geodetic convexity of a graph G, we define the interval of a set $S \subseteq V(G)$, denoted $I(S)$, as the set formed by S and the vertices in any shortest paths with endpoints in S. In the monophonic convexity we consider vertices belonging to any induced path. We say S is convex if $I(S) = S$. In the P_3–convexity we consider only the paths of length 3. The convex hull of S, which is the minimal convex set containing S, can be obtained by repeatedly applying the interval function. A set whose convex hull is equal to $V(G)$ is called a hull set. We consider the problem of determining the maximum number of applications of the interval function necessary to arrive at the convex hull of a set S, given that S is a hull set. Since it is also possible to consider the same problem as an infection problem, where we have a set of initially infected vertices that increases over time, we call the above problem the "Maximum Infection Time Problem". Here, we present a few results about the algorithm complexity of this problem for certain convexities and different classes of graphs.