A survey on graphs with a distinguishing partition

Justin Z. Schroeder, George Mason University, Fairfax VA – 22030

Abstract

A distinguishing partition for an action of a group $\Gamma$ on a set $X$ is a partition of $X$ that is preserved by no nontrivial element of $\Gamma$. As a special case, a distinguishing partition of a graph is a partition of the vertex set that is preserved by no nontrivial automorphism. Not all graphs admit a distinguishing partition – for example, the complete graph $K_n$ for $n \geq 2$ does not admit a distinguishing partition – so a natural goal is to get a better understanding of which graphs admit such a partition. In this talk, we explore three items related to this goal. First, we look at known families of graphs that admit a distinguishing partition, particularly complete equipartite graphs. Second, we determine the maximum (and minimum) number of edges for a graph with connections between distinguishing partitions and the distinguishing number of a graph.

Keywords: vertex partition, graph, automorphism.