Breaking Symmetries: Distinguishing Mycielskian Graphs

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Symmetry in a graph G can be measured by investigating possible automorphisms of G. One way to do this is to color the vertices of G in such a way that only the trivial automorphism can preserve the color classes. If such a coloring exists with d colors, G is said to be *d-distinguishable*. The smallest d for which G is d-distinguishable is its *distinguishing number*. Another measure of symmetry is to consider subsets $S \subseteq V(G)$ such that the only automorphism that fixes the elements of S pointwise is the trivial automorphism. Such sets S are called *determining sets* for G and the *determining number* of G is the size of a smallest determining set. In this talk we'll investigate these parameters in the setting of simple graphs achieved by applying the traditional Mycielskian and generalized Mycielskian constructions. The traditional Mycielskian construction was introduced by Mycielski in 1955 to prove that there exist triangle-free graphs with arbitrarily large chromatic number.