Zero Forcing Polynomial for Cycles and Singly-Chorded Cycles

Kirk Boyer, University of Denver; Boris Brimkov, Rice University; Sean English, Western Michigan University; Daniela Ferrero, Texas State University; Ariel Keller*, Emory University; Rachel Kirsch, University of Nebraska - Lincoln; Michael Phillips, University of Colorado Denver; Carolyn Reinhart, Iowa State University

Zero forcing in a graph is an iterative process where, at each step, any colored vertex with a single uncolored neighbor forces its neighbor to become colored. We define the zero forcing polynomial of a graph $G$ of order $n$ by $Z(G, x) = \sum_{i=1}^{n} z(G, i)x^i$, where $z(G, i)$ is the number of zero forcing sets of $G$ of size $i$. Many different graphs can have the same zero forcing polynomial; however, certain families of graphs can be recognized by their zero forcing polynomial. In this talk, we consider one such family. In particular, we show that cycles, singly-chorded cycles, for $n = 4$ the graph $2K_2$, and for $n = 6$ a graph $G$ consisting of a doubly-chorded cycle with one pendant vertex share the same zero forcing polynomial and no other graphs have this same polynomial.

Keywords: zero forcing set, zero forcing polynomial, cycles