Thomas Ansill, Bonnie Jacob (bcjntm@rit.edu), Jaime Penzella and Daniel Saavedra* (dxs6040@rit.edu). Failed zero forcing and failed skew zero forcing on graphs.

Given a graph $G$, the zero forcing number of $G$, $Z(G)$, is the smallest cardinality of any set $S$ of vertices on which repeated applications of the color change rule results in all vertices joining $S$. The color change rule is: if a vertex $v$ is in $S$, and exactly one neighbor $u$ of $v$ is not in $S$, then $u$ joins $S$ in the next iteration. The skew zero forcing number of $G$, $Z^-(G)$, is the same, but with a slightly modified color change rule, namely that the vertex $v$ itself need not be in $S$.

We have introduced two new graph parameters: the failed zero forcing number, $F(G)$, and the failed skew zero forcing number $F^-(G)$. The failed zero forcing number of $G$, $F(G)$, is the maximum cardinality of any set of vertices on which repeated applications of the color change rule will never result in all vertices joining the set. $F^-(G)$ is defined similarly, but under the modified color change rule.

In this talk, we establish bounds on $F(G)$ and $F^-(G)$. We determine formulas for the failed zero forcing numbers and failed skew zero forcing numbers of several families of graphs, and compare properties of these two parameters. (Received September 17, 2013)