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Graph*. Preliminary report.

For a given graph G , suppose a subset S of the vertices of G are coloured black and remaining are coloured white. By rule, a white vertex may be coloured black if it is the unique white neighbour of a black vertex. We call a set S of the vertices a zero forcing set if whenever the vertices of S are all coloured black, then, by the colour change rule, all of the vertices of G may be changed to the colour black. The zero forcing number of G , denoted by $Z(G)$, is defined as the fewest number of vertices in a zero forcing set for G .

The goal of this lecture is to demonstrate the connection between colouring the vertices of a graph black and white, and the nullity of certain symmetric matrices associated with a graph, and to survey a number of interesting results involving the parameter $Z(G)$, and its relationship with the maximum nullity and hence the minimum rank of a graph. (Received September 14, 2010)