**Title:**

Zero-forcing in Generalized Petersen Graphs

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**Abstract:**

Zero-forcing is a graph process introduced independently in linear algebra, quantum physics and electrical engineering, between the years 2002 and 2008. Due to its broad range of applications, it has attracted the interest of mathematicians, computer scientists, theoretical physicists and engineers.

A graph consists of a set of vertices together with some edges joining pairs of points. Assume the vertices of the graph are colored in blue and white. Iteratively apply the following color changing rule until it does not change the color of any vertex: if a blue vertex has exactly one white neighbor, its white neighbor turns blue. At the end, if all vertices are blue, the initial set of blue vertices is a zero-forcing set. The minimum number of vertices in a zero-forcing set is the zero-forcing number of the graph.

Graphs are ubiquitous network models, and their zero forcing numbers provide valuable network information. However, determining the forcing number of an arbitrary graph results in an NP-complete problem, so there is no efficient algorithm to compute it. Therefore, it is important to find families of graphs for which there is a formula for their zero-forcing number.

In this work, we construct zero-forcing sets in Generalized Petersen Graphs (GPG), prove they are minimal, and derive a formula for the zero-forcing number. In addition, we open up avenues for further research, since GPG are in the intersection of several important classes of graphs to which our results could be extended.