Odd Prime Labeling of the Irregular Snake Graphs

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Graph labeling is one of the most prominent research areas in Graph theory. The history of graph labeling can be traced back to the 1960s. There are numerous graph labeling techniques such as graceful labeling, radio labeling, antimagic labeling, prime labeling, etc. There are a lot of variations of prime labeling and in this research, we discuss one of the variations of prime labeling named odd prime labeling which is very much compelling. There is a very famous conjecture related to this area such that all the prime graphs are odd prime graphs. There is a vast number of publications regarding odd prime labeling of snake graphs. Recent works on odd prime labeling investigate different types of snake graphs such as complete graphs, triangular-type snake graphs, different types of ladder graphs, families of cycle-related and path-related graphs, etc. A graph got from a path graph by replacing each edge with a cycle graph is called a snake graph. In this research, we introduce odd prime labeling for the irregular snake graph which is designed by replacing random edges of the path graph with different sizes of cycle graphs and prove that irregular snake graphs admit odd prime labeling if $k_i - 2 \neq f(V_i)(q + 1) - 1$ where $q \geq 0$ & $q \in \mathbb{Z}$, $f(V_i)$ is the odd prime label of the initial vertex of the cycle and $k_i - 2$ denotes the number of inner vertices of the ith cycle which begins at V_i where V_i is the ith vertex on the horizontal path graph of the irregular snake graph.

Key words: Irregular snake graphs, Odd prime labeling, Snake graphs

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