

PRIME LABELLING OF SKELETON OF A SPIDER GRAPH

W.K.M. Indunil^{1*} and A.A.I. Perera²

¹*Department of Physical Science, Faculty of Applied Sciences, Rajarata University of Sri Lanka, Mihintale, Sri Lanka*

²*Department of Mathematics, Faculty of Science, University of Peradeniya, Peradeniya, Sri Lanka*
**asp1617030@as.rjt.ac.lk*

Graph labelling is an important area of research in graph theory. There are many graph labelling techniques such as graceful labelling, magic labelling, antimagic labelling, prime labelling. Graph labelling is used in many applications such as coding theory, radar, and astronomy. If vertices of a simple graph can be labelled with distinct integers from the set $\{1, 2, \dots, n\}$ in such a way that the labels of any two adjacent vertices are relatively prime, it is called prime labelling. A graph that admits prime labelling is called a prime graph. Around the 1980's the concept of prime labelling was introduced by Roger Entringer where he stated the conjecture that every tree is prime, which remains unsolved. The theory was developed and discussed by A. Tout et al. in 1982. Recent work on prime labelling involves known graphs. Vaidya and Prajapati introduced the concept of k prime labeling in 2011 and probed some results relating to it. The present work focuses on prime labeling of a skeleton of the spider-like graph with the result of the consecutive k -cyclic prime labelling method of a ladder graph. In this labelling, first, we label legs considering as a ladder using the k -cyclic prime labelling. Whenever consecutive integers are not relatively prime, such integers will be shifted to its antenna. This way, we can label for any length of a leg of a spider. Furthermore, prime numbers and their behaviour are not easy to identify because there are arbitrarily large gaps in the sequence of prime numbers. However, in this work, the prime labelling method was used primarily to get an idea about a particular application of the prime numbers. As future work, we aim to find a generalised prime labelling method for these types of spider graphs.

Keywords: k -prime labelling, Prime graph, Spider graphs