Special Issue on:

REFLECTIONS ON LINEAR JACO GRAPHS

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Preface

A Jaco graph is a directed graph (not necessarily connected) which all have well-defined vertex labeling and orientation, and the class of Jaco graphs was introduced by Dr. Johan Kok and his research colleagues in 2014. This class of graphs is named after Pieter Jaco Kok, the late father of Dr. Johan Kok. Since then, Jaco graphs have become examples and counter examples for many concepts and conjectures in the study of graphs.

Jaco-type graphs offer the opportunity to find graphical embodiment of any discrete-time dynamical system provided that, either the data is always integer value or an appropriate ceiling or floor function apply. Based on the assumption that the vertices are always located on the circumference of a well-defined 2-D Jordan curve such as a circle or eclipse with well-defined spacing between consecutive vertices, the graphical embodiments naturally resemble the 2-D approximation of galaxy spirals and other Golden Ratio patterns. In fact, there is an evident relationship between some properties of linear Jaco graphs and Fibonacci and Lucas numbers. Furthermore, in searching for the distance-root vertices of the linear Jaco graph for $f(x) = mx$, with m, x in $\mathbb{R}$, it was found that the corresponding vertex labels correspond to a class of Horadam numbers. Contemplating Jaco graphs and other influences have led to concepts such as McPherson numbers, primitive holes and Pythagorean holes of graphs.

A derivative of Jaco graphs which is currently under study is ornated graphs. These graphs also have well-defined vertex labeling and orientation and allow multiple arcs. Hence, simplicity is relaxed for ornated graphs. More recently the notion of propagating graphs, black energy, black arc number and black clouds of vertices found its basis from Jaco graphs. The concept of Jaco graphs has opened a wide scope for further research for graph theoretic, combinatorial and number theoretic scholars. The project team expresses their warm gratitude to lady Hope Kok, Park Boulevard CC and friends, City of Tshwane, Republic of South Africa, for their publishing grants.

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