College of Science and Health

Department of Mathematical Sciences

MATH SEMINAR

Wednesday, Feb 8, 2023
4:00 – 5:00pm
Science West 221

Zero Divisor Graphs of 3x3 Tri-Diagonal Matrices Modulo 4

Miachael Hernandez (William Paterson University), Jakirah Sanders (Xavier University of Louisiana)

In this research, we describe the zero-divisor graphs of certain tri-diagonal matrices. The focus is on 3 by 3tri-diagonal matrices over the integers modulo 4. We investigate both directed and undirected graphs derived from the left or right zero-divisors of these matrices. The graphs display multiple nuances particularly in scale and symmetry. Using combinatorial methods verified with Python programs we give implicit formulas for the sizes of such graphs. We provide structural properties of them and identify some surprising isomorphic induced-subgraphs.

Graphical Representation of A Social Network

William Du (Delbarton HS), Arnold Rosas (Montclair State University) Sabella Villatora (Barnard College)

In this research, we study a delivery network in a region and apply graph theory and network science principles to describe its properties. The network is described as a directed graph with the cities as the vertices. The edge connections tell the delivery situations. We investigate centrality, clustering coefficient, community structure, and other graph theory properties of the network. Through the software Gephi, the network is represented graphically. The analysis of the directed graph, certain subgraphs, and their underlying graphs demonstrate some interesting properties. The goal of this analysis is to provide valuable information on how to improve both economic and social components of the delivery network. Future research includes analyzing the probability for a certain package to take a certain path to a city.

Dr. Eliana Antoniou, Department of Mathematical Sciences

GS-LSAMP Coordinator, SH East 3049, Phone: (973) 720-3715

Email: antonioue@wpunj.edu