

AN APPLICATION TO ZERO- DIVISOR GRAPHS IN QUANTUM MECHANICS

Akhila M S

Science, Technology, Engineering, and Mathematics, Chinmaya Vishwa Vidyapeeth
(deemed to be university), Ernakulam-686667, Kerala, India

Email: akhिलamohan1729@gmail.com

Abstract

Green and Schroll introduced Brauer graph algebras and Brauer configuration algebras to study algebras of tame and wild representation types. An appropriate system of multisets, called a Brauer configuration, gives rise to these algebras via a suitably defined bounded quiver (or bounded directed graph). The combinatorial properties of such multisets determine the corresponding indecomposable projective modules, as well as the dimensions of the algebras and their centers. Undirected graphs serve as examples of Brauer configuration messages, and the description of the associated data for their induced Brauer configuration algebras is referred to as the Brauer analysis of the graph.

In this paper, we provide closed formulas for the dimensions of Brauer configuration algebras induced by Zero-divisor graphs defined finite commutative rings. As an application, certain quantum entangled states (such as Greenberger–Horne–Zeilinger and Dicke states) are described and analyzed within the framework of suitable Brauer configurations.

Keywords: Brauer Configuration System, Zero- divisor graph, Path algebra, Quantum entanglement, Quiver representation.