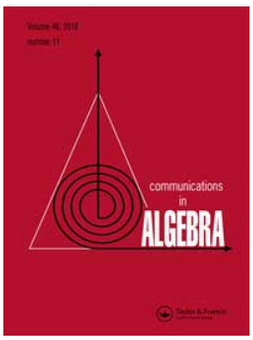

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Leavitt path algebras with coefficients in a Clifford semifield

R. Sen Gupta[a], S. K. Maity[b], and M. K. Sen[b]

[a]Department of Mathematics, Bejoy Narayan Mahavidyalaya, Itachuna, West Bengal, India; [b]Department of Pure Mathematics, University of Calcutta, Kolkata, India

ABSTRACT

In this article, we define the Leavitt path algebra $L_S(\Gamma)$ of a directed graph Γ with coefficients in a Clifford semifield S. The general properties of $L_S(\Gamma)$ are briefly discussed. Then, concentrating on the full k-simplicity (that is, the property of having no nontrivial full k-ideals), we find the necessary and sufficient condition for full k-simplicity of $L_S(\Gamma)$ of a directed graph Γ over a Clifford semifield S. Also, we introduce c-homomorphisms of Leavitt path algebras over Clifford semifields and establish a version of the (Cuntz-Krieger) Uniqueness theorem for the Clifford semifield setting.

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1. Introduction

Leavitt path algebra has emerged as one of the most engaging fields of study in recent times. Ever since it was introduced by Abrams and Pino in their seminal article [2], several mathematicians have extensively worked in this new topic. Having its roots in the Leavitt algebras (a class of K-algebras universal with respect to an isomorphism property between finite-rank free modules, where K is a field) introduced by Leavitt [10] in 1962, Leavitt path algebra is also significant from an analytical perspective as it connects graph C^*-algebras and Leavitt algebras. In fact, obtaining a more complete algebraic picture of the different C^*-algebras (for example, the C^*-algebra $\mathcal{O}_A$ of a finite matrix A, or the Cuntz–Krieger algebra $C^*(E)$ for a finite graph E) was a motivation behind the introduction of the Leavitt path algebra.

Abrams and Pino defined the Leavitt path algebra $L_K(E)$ of a directed graph E with coefficients in a field K. Clearly, this associates algebraic structures with graphs and, therefore, involves both graph theory and algebra. Later, Leavitt path algebras have been generalized when they were defined over rings (by M. Tomforde, cf. [15]) and over commutative semirings (by Katsov et al., cf. [9]). Abrams and Pino found that $L_K(E)$ can be realized as an algebra of the form $\mathcal{CK}_A(K)$ (the latter being the algebraic analog of $\mathcal{O}_A$), and also that the completion of $L_{\mathbb{C}}(E)$ is virtually same as $C^*(E)$. This motivated several researchers to look into the structure and properties of Leavitt path algebras in more details (cf. [1]).

In this article, we introduce the Leavitt path algebra $L_S(\Gamma)$ of a directed graph Γ with coefficients in a Clifford semifield S. Clifford semifields are a particular kind of semirings. We consider

CONTACT R. Sen Gupta raibatak2010@gmail.com Department of Mathematics, Bejoy Narayan Mahavidyalaya, Itachuna, West Bengal 712147, India.