



Some Properties of the Conditional Dual Lucas Octonions

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Abstract – The study of higher-dimensional algebraic structures has gained significant attention in recent years. Octonions, a normed division algebra with eight dimensions, have applications in fields such as quantum logic, special relativity and string theory. In this study, we introduce the conditional dual Lucas octonions. Also, we investigate several important properties and characteristics of these octonions. Firstly, we establish the algebraic structure of the conditional dual Lucas octonions, providing a comprehensive definition and outlining their fundamental mathematical properties. Furthermore, we obtain generating functions, the Binet formulas, Catalan's identities, and Cassini's identities of the conditional dual Lucas octonions. Through our analysis and exploration, we contribute to the understanding of the conditional dual Lucas octonions, shedding light on their algebraic properties. This study ensures a comprehensive overview of the generalization of the various octonions.

Keywords – *Conditional Lucas Sequence, Dual Lucas Octonions, Algebraic Structures, Binet Formula, Catalan's Identities.*