

Applications of Semigroup Theory in Sociological Analysis

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Abstract: *This paper explores the novel application of semigroup theory—a mathematical concept—into the field of sociology. Semigroups, usually studied in algebra, are composed of a set with an associative binary operation that permits the combination of elements in a structured way. Through this exploration of the concept, the paper seeks to offer a new mathematical framework for understanding social interactions and their underlying structures. Specifically, it looks at how semigroup theory can be used. The work uses an interdisciplinary approach to try to bridge the gap between abstract mathematical ideas and sociological theory. It suggests that semigroups' structured character can provide important information about the structures and patterns present in social systems. In the end, this investigation highlights how mathematical models can improve sociological analysis and further our knowledge of social phenomena.*

Keywords: Semigroup Theory; Mathematical Sociology; Structured Relationships; Mathematical Modeling; Social Network Theory.