

# Abstract

This research examines the **canonical number system (CNS)** and its application in the field of algebraic number theory, relating it with attaining monogeneity of field. We begin by defining important concepts such as algebraic integers, the ring of integers, and the discriminant, which form the basis for in-depth exploration of canonical number systems (CNS) within fields. A significant part of this study is devoted to constructing canonical forms and evaluating conditions for monogeneity in specific field extensions. We investigate specific classes of polynomials  $x^5 + ax^2 + b$  to derive necessary conditions for CNS existence. Through a detailed study of these cases, this paper develops a new understanding of trinomial structures and canonical number systems. These findings lead to a deeper understanding of the number-theoretic properties of trinomials and CNS and have potential applications in computational mathematics and other fields.