Centre d'Etudes Doctorales : Sciences et Techniques et Sciences Médicales

Avis de Soutenance

THESE DE DOCTORAT

Présentée par

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Sujet de la thèse

Structure of Prime Rings, BanachAlgebras and constacyclicCodes

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Résumé de la thèse

The concept of a prime ring originated in abstract algebra, particularly in the study of ring theory. A prime ring is defined as a ring in which the product of any two nonzero elements results in a nonzero element. This property plays a crucial role in understanding the structure and behavior of rings, specifically in terms of their ideal structure and factorization properties.

A prime ring finds applications in various branches of mathematics, including algebra, algebraic geometry, codes and number theory etc. They provide a framework for studying important algebraic properties and phenomena.

Many researches over the most recent 50 years have studied the structure of prime and semi-prime rings, exactly they studied the commutativity of prime rings involving algebraic identity connected with different kinds of maps like (endomorphisms, derivations, operators, etc).

In the same context, in this thesis, after recalling some basic notions, preliminary definitions and important results, that will be used in the following. We examine various types of algebraic identities involving different kinds of mappings like automorphisms, derivations, multiplicative generalized derivations, projections and generalized (α, β)-derivations of a prime and semi-prime rings and we extend some results over prime Ba-nach algebra, along with studying the relationship between the structure of prime and semi-prime rings, and the behaviors of mapping mentioned above. Moreover, we have presented different examples which ensure that the primeness condition imposed on the considered rings and Banach algebra is not superfluous in our results. On the other hand,

we study one of the most important and generalized codes, namely"contacyclic codes" over ring $Z_4 + uZ_4$, where $u^2 = 0$. Precisely, we arrive:

- To include some preliminary notions, basic definitions and some important results which may be needed for the development of subject in the subsequent chapters.
- To obtain the commutativity of prime rings by studying some algebraic identities involving multiplicative generalized derivations.
- To investigate the action of generalized derivations on prime and semi-prime rings.
- To study the commutativity of prime rings involving generalized (α, β)-derivations and extend the result over prime Banach algebras.
- To study the commutativity of Banach algebra involving projections.

- To investigate the structures and properties of constacyclic codes over a finis ring $Z_4 + uZ_4$, $(u^2 = 1)$.

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