HACETTEPE UNIVERSITY

GENERAL SEMINAR

SPEAKER

Shakir Ali
Aligarh Muslim University, India

TITLE

Derivations and related maps in rings with applications

ABSTRACT

Let R be any ring and $n \geq 2$ be a fixed integer. An additive mapping $d: R \rightarrow R$ is said to be a derivation on R if $d(xy) = d(x)\,y + x\,d(y)$ holds for all $x, y \in R$. An additive mapping $d: R \rightarrow R$ is said to be a Jordan derivation if $d(x^2) = d(x)\,x + x\,d(x)$ holds for all $x \in R$. An additive mapping $d: R \rightarrow R$ is said to be a Jordan $*$-derivation if $d(x^2) = d(x)\,x^* + x\,d(x)$ holds for all $x \in R$, where R is ring with involution. For $n \geq 2$, it is easy to show (by induction) that if d is a derivation of a ring R, then d satisfying the following relation

$$d(x^n) = \sum_{i=0}^{n-1} x^i\, d(x)\, (x)^{n-i-1} \quad \text{for all } x \in R$$

where $x^0 y = y = y x^0$ for all $x, y \in R$. This functional equation is known as the "n^{th}-*power property*". The study of such mappings were initiated by Bridges and Bergen [1]. In 1984, they proved that such type of map exhibiting n^{th} power property is a derivation on R, when R is a prime ring with identity and when $char\ R > n$ or is zero. In the year 2007, Lanski [4] generalized this result from derivations to generalized derivations in semiprime rings. Recently, author together with Dar [2] introduced the notion of "n^{th}-*power *- property*" and studied these results in the setting of rings with involution. Precisely, an analogous result for Jordan *-derivations on prime rings with involution was obtained by Dar and Ali [2] (see also [3] for more related results).

In this talk, we will discuss the recent progress made on the topic and related areas. Further, we conclude our talk with some recent open problems and applications.

REFERENCES

[1] Bridges, D., Bergen, J. (1984). On the derivation of x^n in a ring. Proc. Amer. Math. Soc., 90, 25–29.

[2] Dar, N. A., Ali, S. (2021). On the structure of generalized Jordan $*$-derivations of prime rings, Comm. Algebra, 49(4), 1422-1430.

[3] Jeelani, M., Alhazmi, H., Singh, K. P. (2021). On n^{th} power $*$-property in $*$-rings with applications, Comm. Algebra, 49(9), 3961-3968.

[4] Lanski, C. (2007). Generalized Derivations and n^{th} Power Maps in Rings, Comm. Algebra, 35(11), 3660-3672.

November 6, 2024
Wednesday
15:00

Hacettepe University
Department of Mathematics
Yaşar Ataman Hall

DEPARTMENT OF
MATHEMATICS