INSTITUTE OF MATHEMATICAL SCIENCES
UNIVERSITI MALAYA

SIRI SEMINAR KUMPULAN PENYELIDIKAN

Title: Functional Equations in Rings Involving Derivations.
Speaker: Prof. Dr. Shakir Ali
Date: 22 July 2024 (Monday)
Time: 10:00 am - 11:00 am
Venue: MM3, Level 2, Institute of Mathematical Sciences, Faculty of Science, Universiti Malaya.

ABSTRACT

Let R be any ring and $n \geq 2$ be a fixed integer. An additive mapping $d : R \to R$ is said to be a derivation on R if $d(xy) = d(x)y + xd(y)$ holds for all $x, y \in R$. An additive mapping $d : R \to R$ is said to be a Jordan derivation if $d(x^2) = d(x)x + xd(x)$ holds for all $x \in R$. 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 functional equation

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

where $x^0 y = y = yx^0$ 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.

References

[1] Bridges, D., Bergen, J. (1984). On the derivation of x^n in a ring. *Proc. Amer. Math. Soc*., **90**, 2529.

[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.

All are Welcome