Locally Nilpotent Derivations

Gene Freudenburg

Western Michigan University, Kalamazoo, Michigan, 49008 USA

This talk will provide a brief introduction and overview for locally nilpotent derivations (LNDs) of integral domains over a field k of characteristic zero. For rings that are finitely generated over k, there is a correspondence between LNDs and algebraic actions of the additive group $(k, +)$ on the corresponding algebraic k-varieties. This is one of the main reasons that LNDs are of interest. Indeed, LNDs can be seen to play a role in many fundamental problems of algebraic geometry, including Hilbert's Fourteenth Problem, the Embedding Problem and Cancelation Problem for Affine Spaces, the Jacobian Conjecture, and the Dolgachev-Weisfeiler Conjecture. We will survey known results and highlight recent developments in this area.

References

[1] Gene Freudenburg , *Algebraic Theory of Locally Nilpotent Derivations* , second ed., Encylopædia of Mathematical Sciences, vol. 136, Springer-Verlag, Berlin, Heidelberg, New York, 2017