

The Central Nullstellensatz over Centrally Algebraically Closed Division Rings

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Abstract

A classical result of Niven and Jacobson [3] states that every equation $x^n + q_{n-1}x^{n-1} + \dots + q_1x + q_0 = 0$, with coefficients from the division ring of quaternions, has a solution in the quaternions. In [1], Alon and Paran proved a central Nullstellensatz for the quaternions, generalizing the Jacobson–Niven result to the case of several commuting variables. In this talk, I will introduce the notion of centrally algebraically closed division ring and present the result that the central Nullstellensatz holds for a division ring D iff D is centrally algebraically closed [2].

Keywords

Algebraically closed division rings, Central Nullstellensatz.

References

- [1] Alon, G., and Paran, E. (2021). A central quaternionic Nullstellensatz. *Journal of algebra*, 574, 252-261.
- [2] Aryapoor, M. (2025). The Central Nullstellensatz over Centrally Algebraically Closed Division Rings. arXiv preprint arXiv:2506.15187.
- [3] Niven, I. (1941). Equations in quaternions. *The American Mathematical Monthly*, 48(10), 654-661.