SCALED PLANAR NEARRINGS

Bieber Marie [a] , **Kuncham Syam Prasad** [b], **Kedukodi Babushri Srinivas** [c,*]

[a] Department of Mathematics, Technische Universität Wien, Austria
marie.bieber@outlook.com
[b,c] Department of Mathematics, Manipal Institute of Technology, Manipal, Karnataka, India
[b] syamprasad.k@manipal.edu
[c] babushrisrinivas.k@manipal.edu [Presenter*, Corresponding Author*]

Abstract: A nearring $(N, +, \cdot)$ is a structure similar to a ring, but without the request to be additively commutative and with just one of the distributive laws. In this work, we deal with a special nearring structure called planar nearring and introduce a new structure called scaled planar nearring. We prove that every scaled planar nearring is zero symmetric and deduce some structure theorems. We illustrate that the scaling factor of the scaled planar nearring can be used to understand ideas from projective geometry. Let $(F, +, \cdot)$ be a finite nearfield and $N = F \times F$. It is well known that if F is a field then the affine plane (N, L, ε) is desarguesian and that finite nearfields (which are not fields) can be used to construct non-desarguesian planes. We demonstrate that a suitable choice of scaling factor can be made to construct desarguesian planes or non-desarguesian planes.

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