Multiplicative loops of topological quasifields

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Abstract

Locally compact connected topological non-desarguesian translation planes have been a popular subject of geometrical research since the seventies of the last century (cf. [1]). These planes are coordinatized by locally compact quasifields Q such that the kernel of Q is either the field $\mathbb{R}$ of real numbers or the field $\mathbb{C}$ of complex numbers. The multiplicative loop $Q^* = (Q\backslash\{0\}, \cdot)$ is homeomorphic to $\mathbb{R} \times S^n$, where S^n is the n-sphere with $n \in \{1, 3, 7\}$. The group G topologically generated by the left translations λ_a, $a \in Q^*$ is a linear Lie group, a closed connected subgroup of the group $GL_{n+1}(\mathbb{R})$ if the kernel of Q is $\mathbb{R}$, whereas a closed connected subgroup of the group $GL_2(\mathbb{C})$ if the kernel of Q is $\mathbb{C}$. In the talk we wish to characterize the algebraic structure of the multiplicative loops for topological connected quasifields which have dimension 2 over their kernel $\mathbb{R}$, or $\mathbb{C}$ and describe the quasifields which coordinatize locally compact translation planes admitting a large Lie group as collineation group (cf. [2]).

References

[1] H. Salzmann, D. Betten, T. Grundhöfer, H. Hähl, R. Löwen, M. Stroppel, Compact projective planes. Walter de Gruyter (1995).

[2] G. Falcone, Á. Figula, K. Strambach, *Multiplicative loops of* 2-*dimensional topological quasifields*, Communications in Algebra, **44** (2016), 2592-2620.