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FAKULTÄT FÜR MATHEMATIK
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Einladung zur öffentlichen Defensio von

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Thema der Dissertation:

**Generic one-step bracket generating distributions of
rank four**

Abstract: Let M be a finite-dimensional manifold. Denote by $H \subset TM$ a smooth distribution and by $[H, H] \subset TM$ the subbundle generated by all brackets of first order among sections of H . We say that H is bracket generating in one step if

$$TM = H + [H, H].$$

The main results of the thesis concern generic one-step bracket generating distributions of rank four. First of all, we get the classification of their types. These exist in dimensions $5 \leq n \leq 10$, and we focus on the cases $n = 8$ and $n = 9$, which have not been treated in the literature. We prove that there exist two generic types of $(4, 8)$ -distributions and that each type is equivalent to a normal parabolic geometry. Aware of this equivalence, we can read out the local invariants for these structures from the harmonic curvature associated to the corresponding parabolic geometries, thus describing them completely from the point of view of the local geometry. The same tools from parabolic geometry find a nice application in the description of submaximally symmetric models of generic $(4, 8)$ -distributions of hyperbolic type.

Using results of Tanaka and Morimoto about the prolongation procedure, which generalize a certain construction for classical G -structures to the filtered setting, we show that the $(4, 9)$ -case is the lowest dimensional in a countable series of one-step bracket generating distributions which determine a canonical linear connection on the tangent bundle TM . The torsion and curvature of this connection, then, are local invariants for these structures.

Prüfungssenat:

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