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Representations of Codimension One Non-Abelian Nilradical Lie Algebras

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Abstract: A Theorem is proved that shows that for a solvable Lie algebra $\mathfrak{h}$ of dimension $n+2$ whose nilradical is codimension one and for which the nilradical has a one-dimensional derived algebra there is a subgroup of $\mathrm{GL}(n+2,\mathbb{R})$ whose Lie algebra is isomorphic to $\mathfrak{h}$. The Theorem helps to give a more conceptual understanding of the classification of the algebras in dimensions four, five and six. Finally the main Theorem is applied to a particularly interesting class of algebras for which the nilradical is isomorphic to the five-dimensional Heisenberg algebra.

Key words: Low-dimensional Lie algebras, right-invariant vector field, Lie algebra extension, codimension one nilradical.

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