N. M. P. S. K. Bandara
Dept. of Mathematics, Florida A & M University, Tallahassee, U.S.A.
narayana.bandara@famu.edu

G. Thompson
Department of Mathematics & Statistics, University of Toledo, Toledo, U.S.A.
gerard.thompson@math.utoledo.edu

Ten-Dimensional Levi Decomposition Lie Algebras with $\mathfrak{sl}(2,\mathbb{R})$ Semi-Simple Factor

Turkowski has classified Lie algebras that have a non-trivial Levi decomposition of dimension up to and including nine. In this work the program is continued and completes the classification of the corresponding Lie algebras in dimension ten, for which the semi-simple factor is $\mathfrak{sl}(2,)$. In the approach adopted here, one begins with a nilpotent Lie algebra NR, which will serve as the nilradical of the Levi decomposition algebra $S \rtimes N$ that is ultimately constructed. Here N denotes a solvable extension of NR. Two key tools used in obtaining the classification are, the R-representation, that is, the action of $\mathfrak{sl}(2,\mathbb{R})$ as endomorphims of NR and secondly the algebra of R-constants, that is, the subalgebra of N that commutes with the R-representation.

Keywords: Semisimple factor, radical, nilradical, R-representation, R-constants Lie algebra.

MSC: 17B05, 17B30, 17B99.