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Locally finite simple Lie algebras

We discuss the possibility of describing some simple locally finite Lie algebras L in the language used in the theory of root graded algebras and its generalizations. This is at least possible in the case of the so called “pure” and “one-sided” direct limits of finite-dimensional simple Lie algebras of type A (terminology due to Baranov-Zhilinski). The coordinate algebra in this case is a locally finite simple associative algebra. Some recent results of Baranov-Zaleski on so called finite-dimensional plain Lie algebras form a basis for representing some locally finite simple Lie algebras (of which our algebras are a particular case) as the Lie commutator subalgebras of appropriate locally finite simple associative algebras. Thus, our results and those of Baranov-Zaleski establish even closer connection between locally finite simple Lie algebras and locally finite simple associative algebras. One of the application of our description is the possibility of constructing new L -modules.

The results of this talk are joint with Georgia Benkart.