Generalized Reductive Lie Algebras: Connections With Extended Affine Lie Algebras and Lie Tori

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Abstract. We investigate a class of Lie algebras which we call generalized reductive Lie algebras. These are generalizations of semi-simple, reductive, and affine Kac–Moody Lie algebras. A generalized reductive Lie algebra which has an irreducible root system is said to be irreducible and we note that this class of algebras has been under intensive investigation in recent years. They have also been called extended affine Lie algebras. The larger class of generalized reductive Lie algebras has not been so intensively investigated. We study them in this paper and note that one way they arise is as fixed point subalgebras of finite order automorphisms. We show that the core modulo the center of a generalized reductive Lie algebra is a direct sum of centerless tori. Therefore one can use the results known about the classification of centerless Lie tori to classify the cores modulo centers of generalized reductive Lie algebras.

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