Structure of strongly nondegenerate prime Lie algebras

Hannes Bierwirth

Hannes Bierwirth (hannes@uma.es)
Universidad de Málaga

Abstract.

In this talk we classify strongly nondegenerate prime Lie algebras (over a field of characteristic $\neq 2, 3$) with abelian minimal inner ideals as those L such that $S \subseteq L \subseteq Q$, where S is a simple Lie algebra and Q is the maximal algebra of quotients of S, which is strongly nondegenerate and prime. Morever, the structure of S and Q will be described. Specifically, the algebras S and Q belong to one of the following cases:

1. $S = L = Q$ is a finite-dimensional (over its centroid) simple Lie algebra of type G_2, F_4, E_6, E_7 or E_8 containing nonzero ad-nilpotent elements of index 3.

2. $S \cong [A, A]/Z_{[A,A]}$, where A is a simple associative algebra which coincides with its socle, A is not a division algebra and $Q = Q_s(A)^-/Z_{Q_s(A)}$, where $Q_s(\cdot)$ denotes the Martindale symmetric ring of quotients.

3. $S \cong [K, K]/Z_{[K,K]}$, where $K = Skew(A, *)$, for A a simple associative algebra with an isotropic involution $*$ coinciding with its socle and such that $Z(A) = 0$ of the dimension of A over $Z(A)$ is greater than 16 and $Q = K_s/Z_{K_s}$, where $K_s = Skew((Q_s(A), *)$.

Moreover: $S = Soc(L)$; if A is as in (2), then $Q \cong Der(A)$ and if A is in (3) then $Q \cong SDer(A)$. In each case Q is a prime strongly nondegenerate Lie algebra.