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On the Nilpotency of Certain Subalgebras of Kac-Moody Lie Algebras

Let $\mathfrak{g} = \mathfrak{n}_- \oplus \mathfrak{h} \oplus \mathfrak{n}_+$ be an indecomposable Kac-Moody Lie algebra associated with the generalized Cartan matrix $A = (a_{ij})$ and W be its Weyl group. For $w \in W$, we study the nilpotency index of the subalgebra $S_w = \mathfrak{n}_+ \cap w(\mathfrak{n}_-)$ and find that it is bounded by a constant $k = k(A)$ which depends only on A but not on w for all $A = (a_{ij})$ finite, affine of type other than E or F and indefinite type with $|a_{ij}| \geq 2$. In each case we find the best possible bound k. In the case when $A = (a_{ij})$ is hyperbolic of rank two we show that the nilpotency index is either 1 or 2.