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### **Central Extension, Derivations and Automorphism Group for Lie Algebras Arising from the 2-Dimensional Torus**

Let  $A = \mathbb{C}[x_1^{\pm 1}, x_2^{\pm 1}]$  be the ring of Laurent polynomials and  $B$  the set of skew derivations of  $A$ . Set  $\tilde{L} = A \oplus B$ . In this paper, we study the automorphism group, derivations and universal central extension of the derived Lie subalgebra of  $\tilde{L}$ .

**Keywords:** Virasoro algebra, central extension, automorphism group.

**MSC:** 17B05, 17B68