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## **Representing Lie Algebras Using Approximations with Nilpotent Ideals**

We prove a refinement of Ado's theorem: a  $d$ -dimensional nilpotent Lie algebra over an algebraically closed field of characteristic zero with an ideal of class  $\varepsilon_1$  and codimension  $\varepsilon_2$  admits a faithful representation of degree  $\binom{d+\varepsilon_1}{\varepsilon_1} \cdot \binom{d+\varepsilon_2}{\varepsilon_2}$ . We then apply the theory of almost-algebraic hulls to generalise this result to the representation of arbitrary finite-dimensional Lie algebras and of Lie algebras graded by an abelian, finitely-generated, torsion-free group.

**Keywords:** Lie algebra, representation, universal enveloping algebra, almost-algebraic Lie algebra, grading.

**MSC:** 17B35