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Malcev correspondence and bi-interpretability.

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Abstract:

We study the famous Malcev correspondence between nilpotent k-groups G and nilpotent Lie k-algebras L over a field k of characteristic zero from the model-theoretic, algebro-geometric, and algorithmic view point. We prove that in this case the group G and the corresponding Lie algebra $L(G)$ are bi-interpretable by equations in each other. This gives a much more precise description of the correspondence, which implies that in addition to the classical categorical properties, the group G and the algebra $L(G)$ share many more algebraic, algorithmic, and model-theoretic properties.