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Lazard Elimination on Arbitrary Alphabets, Lyndon Words and Iterated Smash-Products

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Lazard elimination (LE) theorems provide uniform formulas for every alphabet (of arbitrary cardinality) and have similar schemes for groups, monoids, Lie algebras, and unital associative algebras.
This tool gives rise to many implementable algorithms.
We will start from the most celebrated form of LE i.e. on the category of k-Lie algebras (k being a unitary ring), concentrate on monoids and Lie algebras, and provide examples on iterated smash-products, where the "rewriting on words"(string rewriting) plays a crucial role to understand the normal forms and how one converges to them.
If time permits we will give other applications of word indexing to hyperlogarithms and character theory.
Based on joint work with Vu Nguyen Dinh

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