Simple Lie conformal algebras

Abstract:

The notion of a Lie conformal algebra (LCA) comes from physics, and is related to the operator product expansion. An LCA is a module over a ring of differential operators with constant coefficients, and with a bracket which may be seen as a deformation of a Lie bracket. LCA are related to linearly compact differential Lie algebras via the so-called annihilation functor. Using this observation and the Cartan's classification of linearly compact simple Lie algebras, Bakalov, D’Andrea and Kac classified finite simple LCA in 2000.

I will define the notion of LCA over a ring $R$ of differential operators with not necessarily constant coefficients, extending the known one for $R=\mathbb{K}[x]$. I will explain why it is natural to study such an object and will suggest an approach for the classification of finite simple LCA over arbitrary differential fields.