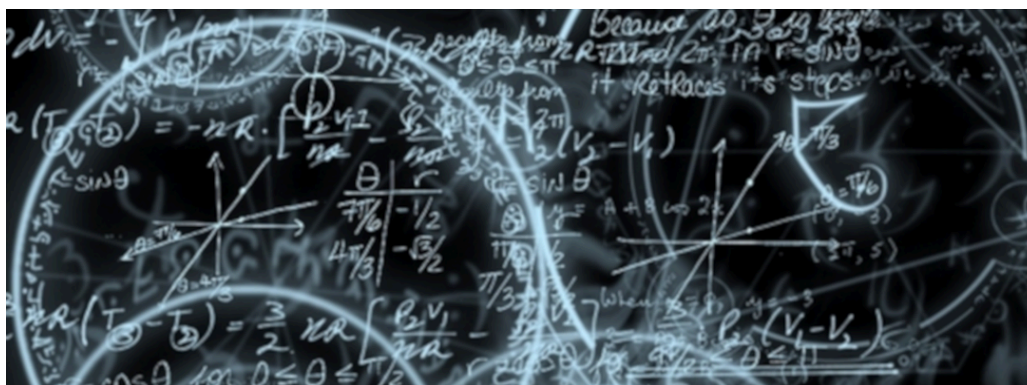


[Home](#) / A universal formal group law and the PBW Theorem

A universal formal group law and the PBW Theorem



Categoria: Seminari di Dipartimento

Data e ora inizio evento: Lun, 14/07/2025 - 11:00

Data e ora fine evento: Lun, 14/07/2025 - 12:00

Aula: Sala di Consiglio

Sede: Dipartimento di Matematica Guido Castelnuovo,
Università Sapienza Roma

Speaker: Ruggero Bandiera - Gruppo Scientifico disciplinare 01/MATH-02, Seminario per chiamata in qualità di Professore di II fascia all'esito di procedure valutative ai sensi e con le modalità previste dall'art. 24, comma 5, della Legge 240/2010, riservate ai ricercatori a tempo determinato con posizione di tipologia B.

Abstract: In a series of papers from the '50s Lazard introduced the concepts of analyzer and formal group law, with the aim of putting in an unified conceptual framework different formal group laws arising in the literature, such as the one by Baker-Campbell-Hausdorff (BCH) or the additive group law on Witt vectors. He further proved that in characteristic zero every formal group law is conjugated to a BCH formal group law via

analogues of the exponential and the logarithm. We shall review Lazard's result from a more modern perspective. More precisely, in general the concept of analyzer is closely connected to the more modern one of operad, and in fact in characteristic zero the two are essentially equivalent. We introduce an operad carrying the universal formal group, and explain its relation with the classical Poincaré-Birkhoff-Witt (PBW) Theorem: namely, a structure of algebra over this operad on a vector space L is equivalent to the datum of a Lie algebra structure on L together with an isomorphism of coalgebras $S(L) \rightarrow U(L)$ between the symmetric coalgebra $S(L)$ and the universal enveloping algebra $U(L)$. Aside from the aforementioned results by Lazard, our approach allows us to recover several results on formal group laws and PBW-type theorems scattered in the literature, such as the ones for pre-Lie algebras. This talk is based on an ongoing collaboration with Frederic Patras.