

On Connes–Kreimer’s beta function and RG flow

Kurusch Ebrahimi-Fard¹

Max Planck Institute for Mathematics
Vivatsgasse 7
D-53111 Bonn
Germany
e-mail: kurusch@mpim-bonn.mpg.de

October, 2006

Abstract

The renormalization group and beta function are fundamental in quantum field theory. Following Connes and Kreimer and Connes-Marcolli, in this talk we will study these concepts from an Hopf algebra perspective. We present direct proofs of their main combinatorial properties, using fundamental properties of Lie algebras encapsulated in the Dynkin operator.

some useful ref.:

A Lie theoretic approach to renormalization

<http://arxiv.org/abs/hep-th/0609035>

K. Ebrahimi-Fard, J.M. Gracia-Bondía, F. Patras

Renormalization in quantum field theory and the Riemann-Hilbert problem II: the beta-function, diffeomorphisms and the renormalization group

<http://xxx.lanl.gov/abs/hep-th/0003188>

A. Connes, D. Kreimer

From Physics to Number Theory via Noncommutative Geometry, Part II: Renormalization, the Riemann-Hilbert correspondence, and motivic Galois theory

<http://xxx.lanl.gov/abs/hep-th/0411114>

A. Connes, M. Marcolli

¹joint work with F. Patras and J.M. Gracia-Bondía