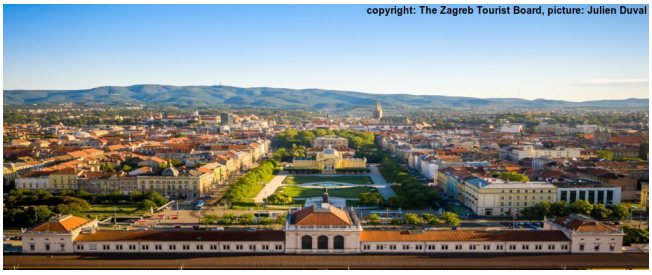

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An easy way to obtain beta functions in gauge theories within Implicit Regularization: a two-loop study

Thursday 15 July 2021 15:30 (30 minutes)

Quantum Field Theory, as the keystone of particle physics, has offered great insights into deciphering the core of Nature. Despite its striking success, by adhering to local interactions, Quantum Field Theory suffers from the appearance of divergent quantities in intermediary steps of the calculation, which encompasses the need for some regularization/renormalization prescription. As an alternative to traditional methods, based on the analytic extension of space–time dimension, frameworks that stay in the physical dimension have emerged; Implicit Regularization (IREG) is one among them. One of the features of IREG is to consistently identify all UV-divergences of a generic Feynman diagram in terms of a well-defined set of basic divergent integrals, which do not need to be explicitly evaluated. This program can be implemented in an algorithmic way, allowing a straightforward extraction of renormalization constants, and the evaluation of beta functions. In this talk we discuss how this program is implemented using QED, QCD, and the SM as working examples up to two-loop order.

Primary authors: ARIAS PERDOMO, Dafne Carolina (Fundação Universidade Federal do ABC); CHERCHIGLIA, Adriano (Universidade Federal do ABC); HILLER, Brigitte (University of Coimbra); SAMPAIO, Marcos (ABC Federal U., Brazil)

Presenter: CHERCHIGLIA, Adriano (Universidade Federal do ABC)

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