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MUΦX
Lehrstuhl X

Seminarankündigung

Deformationsquantisierung

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The Universal Complexification of a Lie Group

In classical Lie theory, a complexification of a Lie group with Lie algebra $\mathfrak{g}$ is a complex Lie group, whose Lie algebra is given by the complexification $\mathfrak{g}_{\mathbb{C}}$ of $\mathfrak{g}$ in the sense of vector spaces. Both from an analytical and a categorical point of view, this definition turned out to be too naive to be truly useful. Historically, this lead to the refined concept of *universal complexification*, which is based on an analytically desirable universal property. In this talk, we motivate this definition by briefly reviewing the vector space situation. Afterwards, we give a rather geometric construction of the universal complexification of a given Lie group, which was formalized by Hochschild around 1955 and refined by the Bourbaki group in the following decade. Along the way, we review Lie's seminal Theorems and meet the universal covering group. While many properties of the resulting universal complexification align with what we geometrically expect, some notable aspects turn out to differ, which we discuss in detail. Finally, we provide some examples to illustrate the power and limitations of the machinery we have developed.

gez. Stefan Waldmann