Announcement

Seminar on Deformation Quantization

11. 6. 2021 at 2 PM CEST

`https://uni-wuerzburg.zoom.us/j/92529190594?pwd=WkJvR1o1QUdldUNSSjFJbHB4c0Z0dz09`

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Cartan geometries and multiplicative forms

Cartan connections on principal bundles are often informally referred to as "curved versions" of Maurer-Cartan forms on Lie groups. In modern language, they are defined by special surjective differential form with values in a Lie algebra of the same dimension of the bundle. These objects appear naturally when dealing with geometric structures on manifolds. For instance, the Cartan connection underlying an n-dimensional Riemannian manifold can be described as the sum of an $\mathbb{R}^n$-valued form (describing the orthonormal frames) and an $\mathfrak{o}(n)$-valued form (describing the Levi-Civita connection). More generally, any G-structure with the choice of a compatible (Ehresmann) connection defines a Cartan connection, by coupling its tautological form with the connection form.

I will start my talk by reviewing the various concepts mentioned above and their basic properties. I will then introduce an alternative approach to these topics via a class of transitive Lie groupoids equipped with special multiplicative vector-valued differential 1-forms, known as Pfaffian groupoids.

This point of view leads naturally to a more general notion, called a Cartan bundle, which encompasses both G-structures and Cartan geometries as extreme cases. Intuitively, it should be thought of as an "intermediate structure", which interpolate between a "naked" geometric structure, and one endowed with a compatible connection. I will conclude by mentioning further results (joint work in progress with Luca Accornero) and speculations (based on discussions with Andreas Cap).

Invited by Stefan Waldmann