Contribution ID: **44**   Type: **not specified**

Properties and Applications of Cotton Tensor

Tuesday, 24 May 2016 09:15 (15 minutes)

The Weyl tensor of a (pseudo-)Riemannian manifold arises as an invariant of conformal transformations of the metric tensor and it is a completely trace-less constituent of decomposition of the Riemann tensor. All the classical results regarding the Weyl tensor are given along with proofs in a unified notation. The vanishing of the Weyl tensor being equivalent to local conformal flatness of the manifold is an important result of Riemannian geometry. However in three dimensions this does not hold, for the Weyl tensor vanishes identically. There is another known tensor, namely the Cotton tensor, that serves as an obstruction to local conformal flatness of a three-dimensional (pseudo-Riemannian) manifold. The Cotton tensor possesses properties that are very similar to those of the Weyl tensor, in particular it is conformally invariant (in three dimensions). We give proofs to all these results as well as probe into the relationship between the Cotton tensor and variations of the Chern-Simons functional. The Weyl tensor and the Cotton tensor play an important role in modern mathematics and theoretical physics and we present a thorough survey of their properties.

Sekce

Teoretická fyzika

Primary author: GARAJ, Filip (CTU FNSPE)

Presenter: GARAJ, Filip (CTU FNSPE)

Session Classification: Teoretická fyzika