

Abstract:

A crucial property of Weyl gravity is its conformal invariance. It is shown how this gauge symmetry is exactly reflected by the two constraints in the Hamiltonian framework. Since the spatial 3-metric is one of the configuration variables, the phase space of Weyl gravity can be extended to include internal gauge freedom by triad formalism. Moreover, by canonical transformations, we obtain two new Hamiltonian formulations of Weyl gravity with an $SU(2)$ connection as one of its configuration variables. The connection-dynamical formalisms lay the foundation to quantize Weyl gravity nonperturbatively by applying the method of loop quantum gravity. In one of the formulations, the so-called Immirzi parameter ambiguity in loop quantum gravity is avoided by the conformal invariance