

Zahra Molaee

IPM

In this note, we delve into a comprehensive study of Hamiltonian analysis utilizing the Dirac-Bergmann algorithm for the intriguing $f(Q)$ Gravity theory. Our primary objective is to investigate the behavior and properties of the theory's Hamiltonian formalism. In this note, there is a significant point that has not been considered in the literature. It involves applying the second class constraints strongly and finding the reduced total Hamiltonian. Then, instead of using Poisson brackets, we calculate the Dirac bracket. As we proceed, a significant contribution of our work lies in the explicit determination of the number of degrees of freedom associated with the $f(Q)$ Gravity theory. By employing rigorous mathematical techniques and leveraging the insights gained from the Dirac-Bergmann algorithm, we shed light on this fundamental aspect of the theory