RONALDO THIBES, Universidade Estadual do Sudoeste da Bahia
Quantization Aspects of the Gauge Invariant Conic Constrained Particle

We consider the recently proposed model of a gauge invariant description of the general conic constrained particle. Starting from an originally second class system we obtain the general classical solution and perform the Faddeev-Jackiw (FJ) symplectic quantization. The FJ brackets are obtained and the symplectic structure in the phase space of the model is described in detail. The last iteration step of the FJ procedure gives rise to a final symplectic potential which is used to obtain gauge invariance. We show how the mentioned symplectic potential can be used in a first-order Lagrangian to produce a new gauge invariant model and pursue its canonical and functional quantization. After introducing the ghost and Nakanishi-Lautrup variables, an explicit BRST symmetry is obtained for the quantum version of the model. The quantum BRST charge and extended Hamiltonian are computed. The symmetries obtained are shown to broadly and neatly generalize previous known particular models. We compare our work with different uses of first-order Lagrangias to obtain gauge invariance in the context of other quantum field theory prototypical systems such as electrodynamics. Compared to previous ones, our approach constitutes a new method which can be used to generate a gauge invariant system from a second-class one.