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Covariant Analytical Mechanics: Hamilton Equations and Path Integral

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A manifestly covariant expression of Hamiltonian analytical mechanics has been applied to obtain Hamilton equations and path integral. The canonical conjugate variables are defined by the external derivative of the potential in this formulation. When applied to gauge fields, this enables us to express the Hamilton equations or path integral without gauge fixing. Consequently, the resulting path integral is free from ghost particles due to the Faddeev-Popov determinant.

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