Degrees of freedom and Hamiltonian formalism for $f(T)$ gravity

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$f(T)$ gravity is the simplest modification of the teleparallel equivalent of general relativity. It is aimed to predict new physics both in high and low energy regimes. Like $f(R)$ theories, $f(T)$ gravity exhibits an extra degree of freedom in any dimension, as has been recently evidenced by means of the Dirac-Bergmann algorithm for constrained Hamiltonian systems. The extra degree of freedom appears because a Lorentz constraint stops from being first-class; it pairs up with a constraint coming from the auxiliar scalar field in the Jordan frame representation. Thus one has a partial loss of the gauge freedom associated with the local Lorentz transformations of the tetrad in the tangent space, which implies that the theory selects preferred tetrads to parallelize the spacetime. We will explain the outcome of the counting of degrees of freedom, and the nature of the extra degree of freedom, by means of a toy model that still contains the essential features of $f(T)$ gravity.