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Abstract

Good vs. Bad Tetrads in f(T) Gravity and the Role of Spacetime Symmetries †

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† Presented at Symmetry 2017—The First International Conference on Symmetry, Barcelona, Spain, 16–18 October 2017.

Published: 9 January 2018

Abstract: It is well known that the field equations of f(T) gravity break local Lorentz invariance if one a priori assumes a vanishing spin connection, except in the teleparallel equivalent of general relativity (TEGR) case f(T) = T + Λ. One consequence is the existence of "bad" tetrads, i.e., tetrads which force a constraint on the field equations, which can be satisfied only in the TEGR case, hence prohibiting any modification of the gravitational dynamics. In order to overcome this difficulty, one may either restrict oneself to "good" tetrads, from which no such constraint arises, or introduce a suitable spin connection, which cancels the constraint. However, there is no simple procedure or general formula for these good tetrads or suitable spin connections, and only particular examples have been constructed. I will show how spacetime symmetries act on good and bad tetrads, and can be used to distinguish them, hence giving a simpler criterion for good tetrads. I will also show how a sufficiently high amount of symmetry can be used to determine either the good tetrads or the required spin connection.

Acknowledgments: The author gratefully acknowledges the full financial support of the Estonian Ministry for Education and Science through the Institutional Research Support Project IUT02-27 and Startup Research Grant PUT790, as well as the European Regional Development Fund through the Center of Excellence TK133 "The Dark Side of the Universe" (National Institute of Chemical Physics and Biophysics, University of Tartu, Tartu Observatory).