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An Invariant Characterization of the Levi-Civita Spacetimes

COOPER WATSON, WILLIAM JULIUS, MATTHEW GORBAN, Baylor University, DAVID MCNUTT, University of Stavanger, ERIC DAVIS, GERALD CLEAVER, Baylor University, EUCOS COLLABORATION¹ — In the years 1917–1919 Tullio Levi-Civita published a number of papers presenting new solutions to Einstein’s equations. This work, while partially translated, remains largely inaccessible to English speaking researchers. In this paper we review these solutions, and present them in a modern readable manner. We will also compute both Cartan–Karlhede and Carminati–McLenaghan invariants such that these solutions are invariantly characterized by two distinct methods. These methods will allow for these solutions to be totally and invariantly characterized. Because of the variety of solutions considered here, this paper will also be a useful reference for those seeking to learn to apply the Cartan–Karlhede algorithm in practice.

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