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Covariant generalized conserved charges of General Relativity

Motivated by the current research of generalized symmetries and the construction of conserved charges in pure Einstein gravity linearized over Minkowski spacetime in Cartesian coordinates, we investigate, from a purely classical point of view, the construction of these charges in a coordinate- and frame-independent language in order to generalize them further. We show that all the charges constructed in that context are associated to the conformal Killing-Yano 2-forms of Minkowski spacetime. Furthermore, we prove that those associated to closed conformal Killing-Yano 2-forms are identical to the charges constructed by Kastor and Traschen for their dual Killing-Yano $(d - 2)$-forms. We discuss the number of independent and non-trivial gravitational charges that can be constructed in this way

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