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Estimating the gravitational-wave content of initial-data sets for numerical relativity using the Beetle–Burko scalar LIOR M. BURKO, University of Alabama in Huntsville — The Beetle–Burko radiation scalar is a gauge independent, tetrad independent, and background independent quantity that depends only on the radiative degrees of freedom where the notion of radiation is incontrovertible, and can be computed from spatial data as is typical in numerical relativity simulations even for strongly dynamical spacetimes. We show that the Beetle–Burko radiation scalar can be used for estimating the graviational-wave content of initial-data sets in numerical relativity, and can thus be useful for the construction of physically meaningful ones, and the identification of "junk" data on the intial value surface. We apply this method for the case of a momentarily stationary black hole binary, and demonstrate how the Beetle– Burko scalar distinguishes between Misner and Brill–Lindquist initial data. The method, however, is robust, and is applicable to generic initial data sets. In addition to initial data sets, the Beetle–Burko radiation scalar is equally applicable also for evolution data.

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