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Can General Relativity's N-body Lagrangian Be Obtained From Iterative Algebraic Scaling Equations?

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A local system of bodies in General Relativity whose exterior metric field asymptotically approaches the Minkowski metric effaces any effects of the matter distribution exterior to the Minkowski boundary condition. A local gravitational system also exhibits certain invariances under time dilation and spatial contractions upon boosts. For composite body sources, interior effacement is manifest in General Relativity as well, leaving a single mass-energy parameter to represent the body in its spherical limit. By enforcing to all orders these properties of gravity which seem to hold in nature, a new method using linear algebraic scaling equations is developed which generates by an iterative process an N-body Lagrangian expansion for gravity which fulfills the mentioned properties — exterior and interior effacement, and the time dilation and Lorentz contraction features of special relativity. The algebraic method is then used to produce the N-body gravity Lagrangian to the 1/cˆ4 order of expansion.

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