Abstract Submitted
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A conformal thin-sandwich solver for generic initial data FETHI M. RAMAZANOGLU, WILLIAM E. EAST, FRANS PRETORIUS, Princeton University — We will present our recently implemented code for an initial data (ID) solver for general relativity, IDSolve. A 3+1 decomposition breaks the Einstein Equations into two groups: hyperbolic "evolution equations" and elliptic "constraint equations." IDSolve aims to provide physically meaningful data that satisfies the constraint equations, which can be used as initial data in numerical evolution. IDSolve uses the Conformal Thin Sandwich (CTS) method and does not assume any symmetries or simplifications of the equations of CTS, unlike most of the currently used ID solvers. Specifically, it does not assume the freely specified conformal spatial metric to be flat. IDSolve uses a parallelized multi-grid (MG) elliptic solver with adaptive mesh refinement (AMR) to solve the CTS equations. Singularities are avoided using a regularization scheme. I will present our results of binary object initial data, for which the generality of our code enables us to set the CTS free data using a superposition of the exactly known single object space-times.

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