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Compactified Hyperboloidal Evolution in Numerical Relativity

One of the challenges in numerical relativity is to include future null infinity in the computational domain with a well-posed formulation. Success will not only enable us to evolve any system of astrophysical interest, e.g. binary black holes and extracting the gravitational wave signal at future null infinity, with any desired accuracy, but also help in studying various phenomena of fundamental interest. One proposal is to use hyperboloidal slices. In this talk, I shall give an alternative approach to numerical relativity that uses hyperboloidal slices, present our ongoing efforts for obtaining a well-posed formulation of the Einstein Field Equations on these slices, and finally propose numerical schemes that assure stability and convergence for linear hyperbolic systems on these slices for long times. A natural extension will be to generalize these numerical methods to full Einstein Field Equations with suitable initial data.

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