

Abstract

In order to further our understanding of the instabilities which develop in numerical relativity codes, I study vacuum solutions of the cosmological type (T^3 topology). Specifically, I focus on the 3+1 ADM formulation of Einsteins equations. This involves testing the numerical code using the following non-trivial periodic solutions, Kasner, Gowdy, Bondi and non-linear gauge waves. I look for constraint violating and gauge mode instabilities as well as numerical effects such as convergence, dissipation and dispersion. I will discuss techniques developed to investigate the stability properties of the numerical code.