

A BRIEF INTRODUCTION TO THE GEOMETRY OF INITIAL DATA SETS FOR THE EINSTEIN EQUATIONS

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The Einstein equations consist of a partial differential system of equations that relate the matter content of a spacetime to its geometry. Even though a spacetime is represented by a Lorentzian manifold, a fundamental result of Choquet-Bruhat allows us to study it by studying appropriate “slices” of it, which in turn are Riemannian manifolds. From an abstract point of view, one then can view Riemannian manifolds (together with some extra information) as “initial data” that will evolve into a spacetime. In this talk, we will give a brief and informal introduction to this topic and discuss some of its cornerstone problems. In addition, we will provide some intuition to some concepts by discussing aspects of a work in progress joint with M. Wolff.