THE ASYMPTOTICALLY SELF-SIMILAR REGIME FOR THE EINSTEIN EQUATIONS

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We develop a local theory for the construction of singular solutions to the Einstein vacuum equations in all spacetime dimensions which become asymptotically self-similar as the singularity is approached. Connections both to Chrisotodulous bounded variation solutions of the spherically symmetric Einstein-scalar field system and to the ambient metric construction of Fefferman and Graham will be elaborated on. In particular, we will see that the techniques developed allow us to construct self-similar solutions which correspond to all of the formal asymptotic expansions of Fefferman and Graham's ambient metric. This is joint work with Igor Rodnianski.