DIFFERENTIAL GEOMETRY/PDE SEMINAR

WEDNESDAY, MAY 21, 2014
PADELFORD C-36
3:50PM–5PM

Initial Data in General Relativity Described by Expansion, Conformal Deformation, and Drift

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Initial data for the Cauchy problem in general relativity satisfy a system of PDEs known as the Einstein constraint equations. These equations are underdetermined, and it has been a long-standing problem to naturally parameterize the solution space. In this talk we give a big-picture overview, from the perspective of diffeomorphsim invariance, of how the two most popular strategies for parameterizing these solutions are, in fact, the same. These strategies, the conformal method and the conformal-thin-sandwich method, apply successfully in constructing constant and near-constant-mean-curvature solutions, but their applicability in the far-from-CMC case has resisted analysis for decades. We describe in the talk how a recently discovered discord between the methods' treatment of diffeomorphism invariance and volumetric degrees of freedom leads, in some cases, to non-uniqueness phenomena. If time allows, we propose from these observations an alternative to the conformal method that has the potential to better-describe far-from-CMC initial data.

For more information about this seminar, visit the DG/PDE Seminar Web page (from the Math Department home page, `www.math.washington.edu`, follow the link **Seminars, Colloquia, and Conferences**).