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Adiabatic Solutions in General Relativity and Boundary Symmetries

Thursday, 8 July 2021 17:50 (20 minutes)

We use Weinberg's trick for adiabatic modes in a Manton approximation for general relativity on manifolds with spatial boundary. This results in a description of the time dependent solutions as null geodesics on the space of boundary diffeomorphisms, with respect to **a metric we prove to be composed solely of the boundary data**. We show how the solutions in the bulk space is determined with the constraints of general relativity. We also rephrase our description in the language of geometric continuum mechanics (see e.g. [1]). We show for the solutions we propose, the **Hamiltonian constraint becomes the real homogeneous Monge-Ampere equation** in the special case of two spatial dimensions.

[1]D. D. Holm, J. E. Marsden, and T. S. Ratiu, "The Euler-Poincare equations and semidirect products with applications to continuum theories",Advances in Mathematics 137 no. 1, (1998) 1-81.

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