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Relativistic Lagrangian perturbation theory in spherical symmetry.

Monday 23 September 2019 15:40 (20 minutes)

Perturbation theories play an important role in general relativity and cosmology. Depending on the framework and the quantities we perturb we can distinguish two main approaches in perturbation theories: Eulerian and Lagrangian. Like in the Newtonian theory, relativistic Lagrangian perturbations allow us to get insight into a mildly non-linear stages of structure formation, substantially exceeding the Eulerian regime. However, there is an inherent level of ambiguity when it comes to evaluating certain functionals (e.g. density, spatial curvature, expansion) within the Lagrangian framework, coming from more than one definition of these fields in terms of governing equations. One possible work-around is to compare the perturbative expectations with some exact relativistic solutions. In my talk I will present such comparison for spherically symmetric dust solutions, the Lemaitre-Tolman-Bondi metrics, with an emphasis on the evaluation of spatial curvature, extending previous works focusing mostly on density field.

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