

Cosmological perturbation theory

The standard models in cosmology are solutions of the Einstein equations with high symmetry (homogeneous and isotropic). Mathematically this leads to ordinary differential equations. In the astrophysical literature the usual next step is to consider linearized perturbations about the symmetric models. A complicating feature of this is the gauge invariance which is the trace of the diffeomorphism invariance of the Einstein equations on the linearized level. In this talk I will explain the known mathematical results on this subject and discuss interesting open problems.