

Homework problems #11

1. Show that the *spatial* Ricci tensor \tilde{R}_{ij} for the Friedmann-Robertson-Walker metric

$$g_{tt} = 1, \quad g_{ti} = 0, \quad g_{ij} = -R^2(t)\tilde{g}_{ij}(x)$$

is of the following form:

$$\tilde{R}_{ij} = -2k\tilde{g}_{ij},$$

where k is the standard parameter of the FRW metric.

2. Show that (tt) , (ij) components of the Einstein equations and the energy-momentum conservation equation ($T^{\mu\nu}{}_{;\nu} = 0$) for the FRW metric are not independent. Explain why does it happen.