COSMOLOGY: AST 625

Homework 2

(1) Find the distance in units of h^{-1}Mpc to an object at redshift z in the standard LCDM model $\Omega_{\rm matter,0} = 0.3$, $\Omega_{\rm vac,0} = 0.7$.

(2) Estimate the volume of the SDSS survey. Assume that the survey covers 5000 sq.deg. on the sky and effectively goes to $z = 0.2$. Assume the standard LCDM model.

(3) Make a plot of the angle $\theta(z)$ at with a galaxy of diameter 10 kpc is observed at different redshifts for the following cases: (1) Flat universe with $\Omega_{\rm matter,0} = 1$. (2) Open Universe with $\Omega_{\rm vac,0} = 0$, $\Omega_{\rm matter,0} = 0.3$. (3) Flat Universe with $\Omega_{\rm matter,0} = 0.3$, $\Omega_{\rm vac,0} = 0.7$. Make the plot on the linear scale of z for the redshifts in the range 0 – 5. Plot all three cases in the same figure. The Hubble constant is $h = 0.7$