PGF5299: Physical Cosmology II

Problem Set 2

(Due September 13, 2019)

1) CMB Power Spectrum. Use CAMB to generate the CMB C_l's. Make plots of C_l versus l, changing the cosmological parameters one at a time, and explain the effects you see on the spectrum. Vary the following parameters:

Ω_m: matter density

T_γ: photon temperature (or similarly its density Ω_γ)

Ω_b: baryon density

Ω_{DE}: dark energy density

Ω_k: curvature density

w: dark energy equation of state

h: Hubble constant

N_{eff}: effective number of massless neutrino species

A_s: spectral amplitude of primordial scalar perturbations

n_s: spectral index of primordial scalar perturbations

τ: optical depth