Department of Physics
Shahid Beheshti University

ADVANCED TOPICS IN MODERN COSMOLOGY

Exercise Set 9

(Date Due: 1393/02/30)

1. Hubble parameter:

   A : Calculate the Hubble parameter as a function of temperature in the relativistic regime for Bosons and Fermion dominated particles. Calculate the exact form of cosmic time as a function of temperature in mentioned regime.

   B : Calculate the Hubble parameter as a function of temperature in the Non-relativistic regime for Bosons and Fermion dominated particles. Calculate the exact form of cosmic time as a function of temperature in mentioned regime.

2. Calculate $\eta \equiv \frac{n_b}{n_\gamma}$ for various stages of universe. Here n_b and n_γ are the number density of baryons and phonon, respectively.

Good luck, Movahed

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