In the name of God

## Department of Physics Shahid Beheshti University

## ADVANCED TOPICS IN MODERN COSMOLOGY

## Exercise Set 11

(Date Due: 1393/02/30)

- 1. According to paper written by Scott Dodelson and Mika Vesterinen entitle "Cosmic Neutrino Last Scattering Surface", PRL 103, 171301 (2009), do following task:
  - $\mathbf{A}$ : Using the relevant equation plot distance to CNB last scattering for various values of  $m_{\nu}$ eV.
  - **B**: Plot the optical depth for CNB as a function of distance to CNB last scattering.

Good luck, Movahed	