

In the name of God

Department of Physics
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ADVANCED TOPICS IN MODER COSMOLOGY

Exercise Set 1

(Date Due: 1393/01/30)

1. Show that the Maxwell's equations under Lorentz transformation are invariant.
2. Write down the covariant form of maxwell's equations.
3. Suppose that a test charge particle moving through x -axis. Find electric field, \mathbf{E} and corresponding magnetic field, \mathbf{B} , from a rest observer with following conditions:
 - A** : Suppose it is moving with constant velocity v_x .
 - B** : Suppose it is moving with constant acceleration a_x .
4. Derive the form of Euler-Lagrange equations for the time-dependent Lagrangians.
5. Find the possible geodesics for the Spherical and Cylindrical manifolds.

Good luck, Movahed
