Problem Set 1

Physics 483

Due January 29

Some abbreviations: Pol - Polchinski

1. Take the action for a point particle with dynamical einbein $e(\tau)$ and $X(\tau)$ fields:

$$S = \frac{1}{2}\int d\tau \left(e^{-1}\dot{X}^{\mu}\dot{X}^{\nu}\eta_{\mu\nu} - em^2\right).$$

Find the equations of motion. Integrate out e and recover the relativistic point particle action discussed in lecture.

2. Pol 1.1

3. Pol 1.3

4. Pol 1.5

5. Pol 1.8

6. Pol 1.9