

## SPECIAL RELATIVITY HOMEWORK – WEEK 9

**Exercise 1.** *Express the most general trajectory  $x^\mu(\tau)$  of a particle with mass  $m$  and charge  $q$  moving in a constant electric field  $\mathbf{E}$ .*

**Exercise 2.** *Do the same for a particle in a constant magnetic field  $\mathbf{B}$ .*

**Exercise 3.** *Consider a general constant electromagnetic field  $F_{\mu\nu}$ . Choose a Lorentz frame wisely, so that the components of this  $F_{\mu\nu}$  take the simplest possible form. What does  $F_{\mu\nu}$  look like in this Lorentz frame? Find the most general trajectory  $x^\mu(\tau)$  of a particle with mass  $m$  and charge  $q$  moving through this field.*