

Chapter 2 Assignment

1) Explicitly write components of x_μ and x^μ , and show $x_\mu x^\mu$ is Lorentz invariant.

2) Show ∂^μ is a contravariant vector.

3) Electromagnetic Field Tensor

a) Show $F^{\mu\nu}$ is antisymmetric.

b) Evaluate all components of $F^{\mu\nu}$.

c) Show i) $\partial_\mu F^{\mu\nu} = \frac{4\pi}{c} J^\nu$

ii) $\partial^\alpha F_{\alpha\mu} + \partial^\mu F_{\nu\alpha} + \partial^\nu F^{\alpha\mu} = 0$