ASSIGNMENT #1

PHYS 821 - Electromagnetic Theory

Due Friday, October 5

PROBLEMS:

1. Jackson 11.7
2. Derive how partial derivative ∂_b of a vector A_a transforms under coordinate change. Is $A_{a,b} \equiv \partial_b A_a$ a tensor? Is $A_{[a,b]} \equiv \frac{1}{2}(A_{a,b} - A_{b,a})$ a tensor?
3. Derive how components of an antisymmetric tensor $F^{\mu\nu}$ transform under Lorentz boost along x^1-axis. Using identification of electric and magnetic field vectors $\boldsymbol{E}$ and $\boldsymbol{B}$ with components of field strength tensor $F^{\mu\nu}$, derive how $\boldsymbol{E}$ and $\boldsymbol{B}$ transform under this boost (c.f. Jackson 11.148).
4. Jackson 11.15
5. Jackson 11.17 (long)
6. Jackson 11.27