Ladislas Walewski
u999999

PX3A3 Electrodynamics

Assignment 1

Question 1. Show how a Maxwell equation emerges from the relationship $\partial_\alpha F^{\alpha\beta} = \mu_0 j^\beta$ when $\beta = 0$.

Answer For $\beta = 0$,

$$\partial_0 F^{00} + \partial_1 F^{10} + \partial_2 F^{20} + \partial_3 F^{30} = \mu_0 j^0$$

$$0 + \frac{\partial E_x}{\partial x} + \frac{\partial E_y}{\partial y} + \frac{\partial E_z}{\partial z} = c\mu_0(c\rho)$$

$$\nabla \cdot \mathbf{E} = \frac{\rho}{\epsilon_0}$$