HW 6.2

Monday, February 22, 2021   8:04 PM

$$L(A^\mu, \partial^\mu A^\nu) = -\frac{1}{4} F^{\mu\nu} F_{\mu\nu} - \frac{1}{c} J^\mu A_\mu$$

$$L = -\frac{1}{4} g_{\alpha\beta}\, g_{\sigma\delta} \left(\partial^\beta A^\delta - \partial^\delta A^\beta\right)\left(\partial^\alpha A^\sigma - \partial^\sigma A^\alpha\right)$$

$$- \frac{1}{c} J^\mu A_\mu$$

$$\frac{\partial L}{\partial(\partial^\nu A^\mu)} = \frac{\partial L}{\partial A^\mu}$$

$$-\frac{1}{4} g_{\alpha\beta}\, g_{\sigma\delta} \left(\delta_\nu^{\ \beta}\delta_\mu^{\ \delta} F^{\alpha\sigma} - \delta_\nu^{\ \delta}\delta_\mu^{\ \beta} F^{\alpha\sigma}\right.$$

$$\left. + \delta_\nu^{\ \alpha}\delta_\mu^{\ \sigma} F^{\beta\delta} - \delta_\nu^{\ \sigma}\delta_\mu^{\ \alpha} F^{\beta\delta}\right) = \frac{-1}{4} 4 F_{\mu\nu}$$

$$= -F_{\mu\nu}$$

E. O. M.

$$+ F_{\mu\nu} = + \frac{1}{c} J^{\mu}$$