Homework 5

1. (10 points) Obtain equation of motion for the quark field

2. (40 Optional) Obtain equation of motion for gluonic fields
Show that color current is not conserved. Show also that
$D^{ac}{}_{\lambda} F^{c}_{\mu\nu} + D_{\mu} F^{c}_{\nu\lambda} + D_{\nu} F^{c}_{\lambda\mu} = 0$
where $D^{ac}{}_{\mu} = \partial_{\mu}\delta^{ac} - g f^{abc} A^{b}_{\mu}$

3. (30 points) Obtain Equation of motion for gluonic fields with Lorentz gauge. Identify the need of introduction of Ghost fields.

4. (30 points) Obtain Equation of motion for gluonic field with Axai gauge. Show that it is possible to eliminate the Ghost field in this gauge.