L14 Addendum

What's this about $\partial_\mu A^\mu_A - K_A$ not having unique value over Θ?

First, note: $\partial_\mu A^\mu_A = 0$ same as:

I want A^A_μ small - as small as possible. Choose Θ^A to minimize:

$$H[A_\mu] \equiv \int d^D x \, \frac{A^A_\mu A^\mu_A}{2}$$ integral over space of $|A^2|$.

Try minimizing over all Θ: minimum occurs ~~for~~ once:

$$0 = \frac{\delta}{\delta \Theta^A(x)} \int d^D y \, \frac{A^B_\mu A^\mu_B(y)}{2}$$

$$\frac{\delta A^B_\mu(y)}{\delta \Theta^A(x)} = \text{well } A^A_\mu \to \partial_\mu \Theta^A - f_{ABC} \Theta^B A^C_\mu + A$$
$$\to [\partial^y_\mu \delta^{AB} - f^{ABC} A^C_\mu] \delta^D(x-y)$$

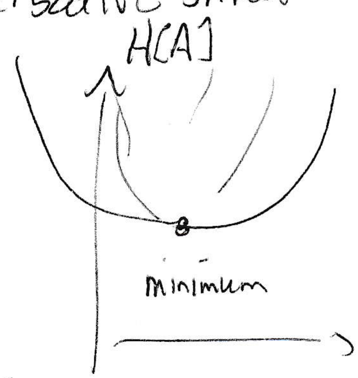
$$0 = \frac{\delta}{\delta \Theta^A(x)} H = \int d^D y \, A^{B\mu}_B(y) [\partial^y_\mu \delta^{AB} - f^{ABC} A^C_\mu] \delta^D(x-y)$$

int-by-parts

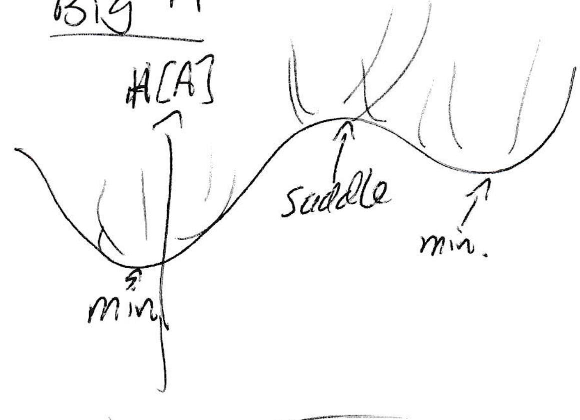
antisymmetric - 0

$$0 = -\partial^\mu A^A_\mu \text{ for } H \text{ to be at } \underline{\text{extremum}}$$

Perturbative small A



Big A



L14 Addendum
P2

Condition $\partial_\mu A^\mu_A = 0$ $\rightarrow$ "Landau Gauge"

Propagator $\dfrac{-i(g_{\mu\nu} - p_\mu p_\nu / p^2)}{p^2 + i\epsilon}$

$\xi = 0$
same as keeping
$\kappa = 0$

Nonperturbative meaning:
"Pick global minimum, over θ, of $H[A_\mu]$"

Otherwise - count too many times if include every min. & saddle.
Or count min. $+1$ or....
saddles -1

Lattice - if you want gauge-fixed observables, use this def - global min of $H[A]$.
If you can find it - very complex multi-min. landscape for $H[A]$......