

Exercise 7

1. Taking all the couplings in the superpotential (12.16) to be equal to λ , and the VEVs to be of order ϕ , estimate the vacuum energy at the minimum of the potential. Is there a regime where the s-confined theory is weakly coupled at the minimum of the potential?
2. Taking the effective superpotential in Eq. 12.36 find the vacuum energy density

$$V = |\mathcal{F}_{\bar{U}}|^2 , \tag{1}$$

assuming a VEV for \bar{U} as given in Eq. 12.42. Is there a consistent regime where $\mathcal{F}_{\bar{U}} \ll \Lambda_{SU}^2$. Assuming that the standard model gauge groups are embedded in the global symmetry of this model for $N = 3$ and taking $\lambda = 0.1$ and $\Lambda_{Sp} = \Lambda_{SU}/100$ what scale (in GeV) is required for Λ_{SU} in order to get a 1 TeV gluino mass (take the messenger mass $M = \Lambda_{SU}$, see Eq. (6.6))