

### Exercise 7

1. Use the equations of motion for the neutral Higgs fields to derive Eqs. (4.34) and (4.35).
2. Show that the tree-level mass of the light neutral Higgs, given in Eq. (4.46), is maximized at  $m_A = \infty$ , and derive the upper bound on  $m_h$ .
3. Taking the couplings  $\alpha_2(\mu) = 0.0322$  and  $\alpha_3(\mu) = 0.0895$  (renormalized at  $\mu = 1$  TeV) use one-loop running to estimate the MSSM unification scale and the value of the unified coupling at that scale.