

Supersymmetry, autumn 2010, exercise 10
(please return on Nov. 25)

1. Write down the scalar potential for a supersymmetric version of the QCD (i.e. gauge group is $SU(3)$), which has only one quark flavour. Thus it is enough to take two chiral superfields, S and T . Assume that the superpotential $W = -mT^T S$. Do not leave any auxiliary fields in your answer.
2. Find the R-parity breaking terms in the Lagrangian for the right-handed sbottom \tilde{b}_R starting from the superpotential given in the lecture notes.
3. Consider a superpotential W with chiral superfields X, Y, Z, Φ, χ ,

$$W = \lambda X(\Phi\chi - m^2) + m\chi Y + \lambda'\Phi Y Z.$$

Determine the R-charges of fields so that all the terms are allowed. Choose then R-charges, which forbid the last term.