

**Problems in Supersymmetry****Sheet 7****Problem 21: Quantum Corrections to the Wess-Zumino model**

Take the Lagrangian of Problem 20

$$\begin{aligned} \mathcal{L} = & \frac{1}{2} \partial_\mu A \partial^\mu A + \frac{1}{2} \partial_\mu B \partial^\mu B + \frac{i}{2} \bar{\psi} \not{\partial} \psi - \frac{1}{2} m^2 (A^2 + B^2) - \frac{1}{2} m \bar{\psi} \psi \\ & - mgA(A^2 + B^2) - \frac{1}{2} g^2 (A^2 + B^2)^2 - g \bar{\psi} (A - i\gamma_5 B) \psi \end{aligned}$$

and calculate the one-loop corrections to the Vacuum energy as well as to the mass of the Fields  $A$ ,  $B$  and  $\psi$ .