**1. Derive the four-Fermi interaction between the left-handed lepton and quark doublets as a low energy limit of the standard model gauge interactions.**

**2. In the standard model extended by a heavy, singlet, real, scalar S, derive the classical equation of motion for S. Assuming all new dimensionful parameters are of the same order as the mass of S, solve the equation as an inverse expansion of the mass up to the products of light fields of the 6th power.**

**3. In the same model as the above, reproduce the result for the interaction kernel X\_WW in the example 5.**