Elementary Particles II   Problem Set #2   due 28/11/02

I. Two Generation Mixing

1. Count the number of flavor parameters in a two generation model. Write the most general form of a 2×2 unitary matrix $V_{\rm C}$. Write the explicit form of the 2×2 phase matrices P_u and P_d such that $P_u V_{\rm C} P_d^*$ has the minimal number of phases.

2. Consider a two generation model with massive left-handed neutrinos. The mass terms for the left-handed neutrinos are of the form $\nu_L^T M^\nu \nu_L$. How many flavor parameters describe the lepton sector? Write down explicitly a parametrization of the leptonic mixing matrix with the minimal number of phases.