University of California at Santa Barbara  
Physics Department  
Physics 125 Homework 5  
due 7 May 2003

• Problem 1
(a) Draw Feynman diagrams to convince yourself that possible decays of the neutral kaons into electrons or positrons are $K^0 \rightarrow \pi^- e^+ \nu_e$ and $\bar{K}^0 \rightarrow \pi^+ e^- \bar{\nu}_e$.
(b) Show that, to first order in the small parameter $\epsilon$

\[ A = \frac{\Gamma(K_L \rightarrow \pi^- e^+ \nu_e) - \Gamma(K_L \rightarrow \pi^+ e^- \bar{\nu}_e)}{\Gamma(K_L \rightarrow \pi^- e^+ \nu_e) + \Gamma(K_L \rightarrow \pi^+ e^- \bar{\nu}_e)} = 2 \text{ Re}(\epsilon) \]

• Problem 2
Griffiths 4.35

• Problem 3
Griffiths 6.2