

Problem Set 4 — due Monday, June 2

1. Problem 9.8 of Griffiths.
2. Problem 9.17 of Griffiths.
3. Problem 10.20 of Griffiths. *Except:* instead of assuming $2m_t < m_Z$, use the experimental fact that $2m_t > m_Z$, so $Z \rightarrow t\bar{t}$ is forbidden. Also, in part (c), do not consider adding one whole extra generation, but just one additional flavor of (massless) neutrino. What percentage error on the lifetime (or equivalently the width Γ_Z) was required at LEP to rule out the existence of a fourth light neutrino at the level of three standard deviations (3σ)?
4. Problem 11.21 of Griffiths.