Problems Lecture 1: Linac Basics

1) Calculate the relative longitudinal motion of two particles with an energy of $9\,\mathrm{GeV}$ and a difference of 3% over a distance of $21\,\mathrm{km}$.

2) Calculate the solutions to Hill's equation for $K(s) = K_0 > 0$.

3) Calculate the solutions to Hill's equation for $K(s) = 0$ assuming $\beta(s = 0) = \beta_0$ and $\beta'(s = 0) = 0$.

4) How much energy is roughly stored in one ILC cavity at nominal gradient?