

Homework 9 (due Apr 22)

1. Consider a lattice made up entirely of thick quadrupoles, each of length L , in which the normalized gradient alternates between $K > 0$ and $-K < 0$. Find (numerically) for what values of \sqrt{KL} the transverse motion in such a system is stable.
2. Suppose that a 10 GeV/c proton beam with normalized 39% emittance of $2 \mu\text{m}$ is injected into a synchrotron with periodic FODO structure of half-cell length $L = 30 \text{ m}$ and cell phase advance $\mu = 68^\circ$. The synchrotron offers a constant physical half aperture of 50 mm.
 - (a) Estimate the boundaries of the beam excursions in both displacement and angle.
 - (b) Calculate the admittance of the machine.