

USPAS Graduate Accelerator Physics Homework 16

Due date: Wednesday February 17, 2021

1 Thin cavity matrix

(30 points) Derive Equation 13.17.

$$L_e = -\frac{1}{mc^2} \frac{1}{\beta_r^3 \gamma_r^3} \frac{2\pi(s_{n+1} - s_n)}{\lambda_{RF}}$$

2 Net focussing strength of two closely separated quads

(10 points) Prove Equation 13.30.

$$\frac{1}{f_{net}} \approx -\frac{L}{f^2}$$