1. Problem 7.15 in the textbook by Prof. Chuang, but assuming instead that the loss outside the waveguide is 13 cm\(^{-1}\). Also, assume that the cavity length is 600 \(\mu\)m.

2. Problem 10.1 in the textbook by Prof. Chuang.

3. Problem 10.4 in the textbook by Prof. Chuang. For part (b) it would be useful to present the results as a 2D plot in color \((R_j \text{ vs } R_i)\) if you have readily available capabilities to do so.

4. Consider an AlGaAs/GaAs DH semiconductor laser with \(\eta_i = 0.95\) and a loss coefficient \(\alpha_i = 10 \text{ cm}^{-1}\), working at emission wavelength of 850 nm. Assuming that the facets have identical reflectivity properties, investigate with the aid of plots how the output power \(P_{out}\) behaves as a function of \(R\) of the mirrors and of the length of the cavity \(L\), for a fixed input power \(P_{in}\). For simplicity consider a perfect heat sink that maintains the temperature constant.