Problem 1 (5 points). In words, pictures and equations discuss the Eikonal Equation and its implications in ray optics.

\[ |\nabla \phi(r)|^2 = n^2(r) \]

Problem 2 (5 points). Using ray matrices derive the overall “round trip” matrix for a laser cavity comprising 2 spherical mirrors (curvatures R1 and R2) separated by a distance d. Under what conditions is this cavity “stable” in the Kogelnik and Li sense?