Assignment-11: due on 2 November 2023

1. Consider a shock perpendicular to x-axis at $x = 0$ in a compressible fluid. If for $x < 0$ the fluid velocity makes an angle θ to the x-axis, while on the other side the angle is ϕ, find the law of refraction connecting, θ and ϕ in terms of the density compression $r = \rho_2/\rho_1$. Which angle is smaller? Is it possible to have a total internal reflection?

2. For the shock considered, find the ratio of Mach Nos, M_{n2}/M_{n1} in terms of $r = \rho_2/\rho_1$. Find the values in the limit of weak and strong shocks. Obtain the expression for r and R in terms of M_{n2}.