Pre-Lab Assignment for Experiment 6

Michael Brodskiy
Professor: E. Marengo Fuentes

November 8, 2023

1. Derive an equation for the critical angle in terms of n_1 and n_2 when $n_2 < n_1$. Find the critical angle for total internal reflection from water ($n = 1.33$) to air ($n = 1.00$).

   Since we know θ_c occurs when the second angle is $90°$, we may write:

   $$n_1 \sin(\theta_c) = n_2 \longrightarrow \theta_c = \sin^{-1}\left(\frac{n_2}{n_1}\right)$$

   For water to air motion, this becomes:

   $$\theta_c = \sin^{-1}\left(\frac{1}{1.33}\right)$$

   $$\boxed{\theta_c = 48.75°}$$