

Problem 8.25 Suppose that the optical fiber of Example 8-5 is submerged in water (with $n = 1.33$) instead of air. Determine θ_a and f_p in that case.

Solution: With $n_0 = 1.33$, $n_f = 1.52$ and $n_c = 1.49$, Eq. (8.40) gives

$$\sin \theta_a = \frac{1}{n_0} (n_f^2 - n_c^2)^{1/2} = \frac{1}{1.33} [(1.52)^2 - (1.49)^2]^{1/2} = 0.23,$$

or

$$\theta_a = 13.1^\circ.$$

The data rate f_p given by Eq. (8.45) is not a function of n_0 , and therefore it remains unchanged at 4.9 (Mb/s).
