Problem 2

Consider a parallel, transparent plate of thickness d – Fig. 1. Its refraction index varies as

$$n = \frac{n_0}{1 - \dfrac{x}{R}} .$$

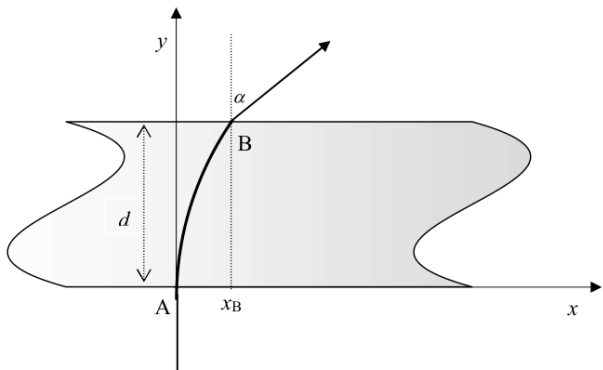


Fig. 1

A light beam enters from the air perpendicularly to the plate at the point A ($x_A = 0$) and emerges from it at the point B at an angle α.

1. Find the refraction index n_B at the point B.
2. Find x_B (i.e. value of x at the point B)
3. Find the thickness d of the plate.

Data:

$n_0 = 1.2$; $\quad R = 13\,\text{cm}$; $\quad \alpha = 30^\circ$.