Optics – Problem III (7points)

Prisms

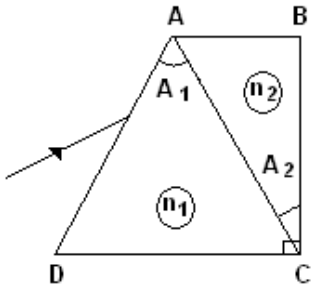
Two dispersive prisms having apex angles $\hat{A}_1 = 60°$ and $\hat{A}_2 = 30°$ are glued as in the figure below ($\hat{C} = 90°$). The dependences of refraction indexes of the prisms on the wavelength are given by the relations

$$n_1(\lambda) = a_1 + \frac{b_1}{\lambda^2};$$

$$n_2(\lambda) = a_2 + \frac{b_2}{\lambda^2}$$

were

$a_1 = 1{,}1$, $b_1 = 1 \cdot 10^5\ nm^2$, $a_2 = 1{,}3$, $b_2 = 5 \cdot 10^4\ nm^2$.



a. Determine the wavelength λ_0 of the incident radiation that pass through the prisms without refraction on AC face at any incident angle; determine the corresponding refraction indexes of the prisms.

b. Draw the ray path in the system of prisms for three different radiations λ_{red}, λ_0, λ_{violet} incident on the system at the same angle.

c. Determine the minimum deviation angle in the system for a ray having the wavelength λ_0.

d. Calculate the wavelength of the ray that penetrates and exits the system along directions parallel to DC.