

**On the validity of an approximation for the deviation of a light beam by a prism**

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**Abstract**

According to many textbooks on optics, the deviation angle of a prism with the apex angle (or prism angle),  $\gamma$ , and the refractive index,  $n$ , with respect to the surrounding medium can be approximated by  $\delta_{app} = (n-1)\gamma$ , if  $\gamma \ll \pi/2$  and the angle of incidence  $\alpha_1 \ll \pi/2$ . The validity of this approximation is investigated considering the relative error of the deviation. It is shown that this approximation can be extended to angles of incidence  $\alpha_1 = n\gamma$  with very fair accuracy and even to larger prism angles  $\gamma < \pi/4$  in the range of angles of incidence near the minimum of deviation depending on the acceptable relative error.