

## An influence of the external electric field and internal imperfections on the reflectance and transmittance of light propagated in liquid crystals

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*Abstract:* Electric fields acting on the molecules of the liquid crystals generate additional torques determining its internal structure, i.e. distribution of the optical axis. On the other hand, some disturbances in the distribution of the optical axis may be caused by internal imperfections of the liquid crystal structure or may depend on the boundary conditions between the investigated optical medium and the bounded glass. In this paper we investigated numerically the influence of the changes in the direction of the optical axis of the liquid crystals on the reflectance and transmittance of light propagated inside the mentioned optical birefringent networks. In order to model optical phenomena in the considered systems, we employed an exact  $4 \times 4$  matrix method. Interesting reflectance and transmittance spectra and plots for different system parameters and arbitrary incident monochromatic light were obtained and reported. The presented results can be useful for understanding various birefringent optical systems, especially liquid crystal displays.

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