Influence of polarizers and thickness of LC layer on angle characteristics of luminance in reflective TN display

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The aim of our work is to determine the influence of polarization coefficient of polarizers used to construct reflective liquid crystal displays and thickness of LC layer on display angle characteristics of luminance. The reflective displays are very interesting, because make it possible to use the external light to create visualization. Therefore, they can be used in the case of high external illuminating not requiring high power supply.

The proper determining of the influence of chosen elements on display optical parameters, especially in angle depiction, is very useful and can be helpful in display construction process. In this paper we present such the results concerning the properties of polarizing films and thickness of LC layer. To obtain the angle characteristics of display luminance the computer program basing on numerical procedure worked out in our Institute was used. This program makes it possible to calculate the values of display luminance for any spectral characteristics of polarizers transmission, illuminating source and human eye sensitivity. Additionally, it makes it possible to analyze of luminance for the display with antireflective layer on the front panel of the display.

Obtained results show exact influence of polarizing coefficient of used films and LC layer thickness on angle characteristics of luminance contrast ratio in reflective TN display in the both situations: with and without antireflective layer. These results give very useful information for display constructors, because precisely determine the possibilities and range of changes of angle characteristics of luminance in reflective TN display obtained by the changing of the polarizing films and LC layer thickness.