ABSTRACT

ANALYSIS OF THE INTERFERENCE PATTERN IN MICHELSON INTERFEROMETER AS TRANSPARENT MATERIALS WITH THICKNESS DETECTION METHOD USING IMAGE PROCESSING SENSOR CHARGE COUPLE DEVICE (CCD)

by

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One of the functions of Michelson interferometer is to measure the thickness of a material. Therefore is necessary to employ in the detection of the thickness of transparent materials for examples acrylic and glass. Detection of transparent materials is done by monitoring the alteration of frinji pattern which formed on Michelson interferometer. The analysis is done by observing the value of greylevel which formed in the results of the image processing that is carried out. Monitoring of greylevel value is done by draw out a line from light center to the end of the frinji pattern. Light pattern will showed by the high level of greylevel value and the dark pattern will showed by the low level of greylevel value. Thereby, the alteration between the first and second dark patterns can be seen. The frinji pattern which formed when Michaelson inferometer hasn't given sample yet is used as first data or can be considered as in normal condition. The frinji pattern that come out when sample is already given is compared to the frinji pattern without sample and those will producea different value which shows the influence of sample distribution. Observation is done with a favor from the camera's CCD censor. Results from those images that had been caught before are processed till they showed the alteration value. From the research that has been done, the thickness of 2 mm acrylic is 0,8 mm and 3 mm acrylic is 1,7 mm. At the measurement of the glass, the thickness of 1 mm glass is 0,6 mm, 2 mm is 0,8 mm, and 3mm glass is 2,1 mm. The obtained results, indicate that the alteration of wave phase (φ) is happened as an impact of distributing sample on one of the shaft of light rates. The alteration of wave phase (φ) on one of light waves resulting a transformation of interference pattern on Michaelson interferometer's frinji.

Keywords: *Interferometer Michelson, thickness of glass and acrylic, CCD sensor*