Age Determination and Comparison of Open and Globular Star Clusters by HR-Diagram

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Star cluster is a group of stars formed at comparatively same period with same distances away from the observers. There are two types – globular and open clusters. This research aimed to calculate the age of both cluster types and compare them. Generally, HR diagram study requires larger telescope size with more advanced software. However, this research used smaller telescope with easier processes which is suitable for nonprofessional researchers such as students to be able to receive accurate outcomes. In this research, observations utilizing B (400 – 500 nm) and V filters (visible light) were conducted using 0.7-meter robotic telescopes in Springbrook, Australia and Sierra, America. In order to create B and V filtered magnitudes to plot in the HR-diagram, the data were analyzed by astronomical simulation programs including AstroImageJ, Aperture photometry Tool, and SAOImage DS9. The important information which can be used in the determination of cluster age can be obtained from the differences in magnitude and the turnoff point in the HR-diagram. Typically, calculation and isochrone are both commonly used methods for cluster age determination. In comparison, from the study, isochrone gives better accuracy on the information. The results showed that ages of the open clusters can be estimated to be in the range of 10 – 50 million years while those of globular clusters can be over 10 billion years.