Distance and Ages of Star Clusters

Karoki Anthony Mugambi

Abstract

Study of star clusters. Using data to show how clusters can be used to measure the relative distances and ages of stars in the cluster. Using optical and infrared data to generate a CMD plotting. In this exercise, you will determine the colour of many cluster members and plot them on a Colour-Magnitude diagram. This is just a type of Hertzsprung-Russell (HR) diagram in which we plot Colour Index rather than Spectral Class on the horizontal axis; and use the apparent visual magnitude, V, for the vertical axis.

Contents

1 General Introduction on Star Clusters

Most stars in the universe form in clusters. By fact that the star clusters are formed from a common gas cloud, they thus have similar age and common distance. The common age and distance makes stellar clusters particularly important in studies of stellar ages and luminosities.
Photometric measurements can be used to determine the age of a cluster and its distance.

1.1 Open Cluster

Open clusters are diffuse star clusters hosting a few hundreds or thousands of stars.

1.2 Globular Cluster

Globular clusters are very dense, hosting millions of stars in the space of only a few parsecs.

2 Background, Preliminary, and Related Work

2.1 Messier 7 Open Cluster

M7 also goes by the designations **NGC 6475** and **Ptolemy's Cluster**. M7 was known as early as the year 130 CE when it was mentioned by Ptolemy. It si a large bright star cluster visible to the naked eye in the constellation Scorpius.
It is part of the Milky Way galaxy.

2.2 Messier 54 Globular Cluster

M54 also goes by the designation **NGC 6715**. It is a compact globular cluster.
It was the first extragalactic cluster ever discovered and is recognized as part of the Sagittarius Dwarf Galaxy (SDG). It is located in the constellation Sagittarius.