Selection and statistical analysis of binary systems in the Magellanic Clouds

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Thesis abstract

This thesis presents the analysis of eclipsing and ellipsoidal binary systems in the Large and Small Magellanic Cloud based on the data collected by the OGLE project. The first problem described is the automatic selection of the binary stars from the data base of OGLE light curves. For that purpose, machine learning approach was used. Classification was done in two steps using Random Forest algorithm.

Next part of the thesis is dedicated to the OGLE collection of binary stars sin the Magellanic Clouds. It contains 48 605 objects, which makes it the largest sample of its kind in that stellar environment.

Period-luminosity and period-luminosity-color relations formed by ellipsoidal red giants and early-type main sequence close binary systems were also analyzed. For ellipsoidal binaries two different groups were identified: giant-giant and giant-dwarf systems, which form different relations.

In case of early-type binary systems, the period-luminosity-color relation was calibrated for the first time. This relation differs from the one previously known for late-type stars.

key words:

variable stars, binary stars, Magellanic Clouds

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