

**Practical round. Problems to solve**

Group α – problems 11-12,
Groups β , γ – problems 11-13.

Reminding. Problems of the Practical round compiled in such a way that when writing solutions, use of any language is not required from the participant. So

texts are not allowed

in solutions of the problems (neither in the native language, nor in English).

13($\beta\gamma$). Cepheids. The distance to the Large Magellanic Cloud is 50 kpc, and its diameter is 10 kpc. During the research of this Galaxy, 12 Cepheids were discovered, most of which belong to the LMO, but some stars are only projected onto the galaxy. The data of the observations presented in Table 13 (see separate sheet).

- 13.1.** Plot graph of the dependence of the apparent magnitude on the period for these stars. It is known that the magnitude of the Cepheids depends almost linearly on the logarithm of the period, so the X-axis should be made logarithmic (the decimal logarithms of the periods along the axis).
- 13.2.** Identify which of these stars belong to the LMO and which do not.
- 13.3.** Calculate the distances to those stars that are outside of the BMO.
- 13.4.** Based on the graph, derive the formula for the dependence for Cepheids of the absolute magnitude (M) on the period (P , in days), calculate the necessary coefficients in this formula.