

# METHODOLOGY OF APPLYING MATHCAT, MAPLE MATHEMATICAL PACKAGES TO PRACTICAL COURSES FROM ASTRONOMY

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**Abstract.** *This article presents the method of using a number of computer programs that facilitate the practical training of the astronomy course. Teaching astronomy through the use of computer programs not only increases students' interest in science, these programs help students find solutions to problems in a short time and strengthen their knowledge of the subject.*

**Keywords:** *Mathcat, Maple, AutoPlay, innovative, practical, task.*

**Introduction.** As in all natural-mathematical sciences, the role of practical training in astronomy, cosmonautics and astrophysics is of particular importance in the deep mastering of educational materials. Although solving tasks in astronomy has a certain degree of commonality with solving tasks on other natural sciences, solving its tasks also has its own characteristics. In particular, the ability of students to think abstractly and visualize plays an important role in solving tasks related to the positions and movements of stars, planets, the Sun and the Moon. Their tasks are qualitative and computational, analytical and synthetic, like on physics, and practicing them more plays an important role in the development of students' thinking, observation, and algorithmic skills. Below are some task-solving topics that encourage students to actively think about it.

Solving tasks about the celestial sphere, its main points, lines and circles. Topics such as solving tasks on finding the coordinates of a celestial body and the connections between them, on finding culmination and culmination heights of luminaries, on the spherical triangle and its basic formulas, on true and mean solar time, and on the equation of time, on calculation of the moment of sunrise and sunset and the azimuths of the sunrise and sunset points, on the refraction of lights, on Kepler's laws and the configurations of the planets, on the calculation of distances and sizes of solar system bodies are intended for students of the field of Physics and Astronomy of Pedagogical higher education institutions.

**Main part.** The use of new information technologies in educational processes leads to a sharp increase in the effectiveness of teaching. In the application of information technologies to the educational process, first of all, the principles of education are followed. All the programs and packages we have listed above will help you learn astronomy quickly and easily.

All quantities measured during practical training are sent directly to the computer through special converters. It is possible to continuously monitor any small changes in the computer and the laws associated with these changes. Measuring accuracy increases dramatically and becomes easier. We are far from the idea of fully explaining the basics of the interface (communication tool) in this short topic, but taking into account the lack of literature in this field in the Uzbek language, we found it advisable to briefly describe the mechanism of using the interface in astronomical measurements. Nowadays, drastic changes are taking place in modern production.

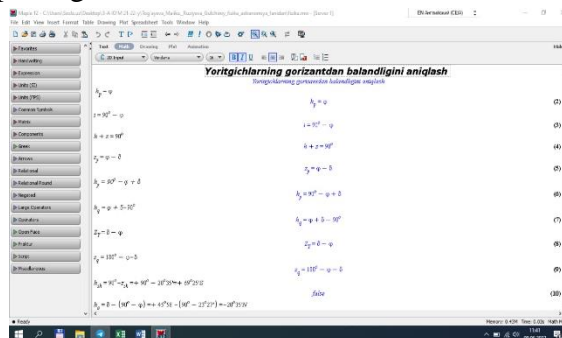
Their essence is that, due to the development, the achievements of the science of astronomy are being put into practice very quickly.

Therefore, if we use computer technologies, it is possible to perform tasks that could not be performed at all in the previous conditions, and in practical training, it is possible to dramatically increase the efficiency of finding a solution to a problem quickly and easily.

Today, there are computer information systems that are of great interest in fields such as education, science, and technology. In addition, the continuous development of science and technology leads to the emergence of new information systems, development and improvement of existing ones. As for education, the introduction of new technologies, as well as comprehensive modernization, are the main issues that receive special attention not only in Uzbekistan, but also in the whole world. The introduction of information technologies in the educational process is ensured by the fact that it effectively complements the existing educational technologies or has additional advantages over traditional forms of education. For example, the use of computer packages that we offer in teaching astronomy allows to make practical training more qualitative and interesting, and also improves the quality of education.

Since astronomy is the basis of scientific and technological progress, the value of astronomy and the role of astronomy are increasing more and more. Astronomical knowledge and astronomical methods are required in almost all spheres of human activity. The use of astronomical knowledge and skills is necessary for everyone to solve practical problems of everyday life.

Methodology of teaching the topic of calculating the height of lighting above the horizon using the Maple12 computer package:



**Conclusion.** The advantages of the above-mentioned computer packages are that these programs can be installed on almost any computer and used for free. In addition, the size of the programs is small, they take up little space, and most importantly, they are very convenient for the student to study and work independently, so the student can strengthen the knowledge of the astronomy course outside the classroom.

*Scientific novelty: The scientific novelty of the article is that, for the first time, the methodology of applying Mathcat, Maple mathematical packages to astronomy practical training for students of Pedagogical higher education institutions has been developed. By using these packages, the student has the ability to easily master practical training.*

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