«ASEDU-2020: Advances in Science, Engineering and Digital Education»

«Teaching stochastics to bachelors of mathematics: computer simulation for conceptual understanding»

Kuznetsova E.V., Zhbanova N.Yu.
The professional training of mathematics students is notable for the large volume and complexity of the content of educational material. In this regard, the problem of conceptual understanding is relevant.

Since many objects in mathematics have a high level of abstraction, studying them, it is essential to come to conceptual understanding through various forms of knowledge representation, and computer simulation will help in solving this problem.
Our objectives of a computer workshop on stochastics are:

- assistance in understanding the probabilistic nature of the objects;
- active, meaningful assimilation of probabilistic concepts;
- the formation of the skills necessary for the analysis and processing of data using a computer and stochastic modeling skills.

Discussed method for the formation of probability theory concepts involves the experience of the stochastic activity, many alternative approaches, various representations of the same object: symbolic, graphic, computer model.

To achieve understanding in the new material, we:

- focus on those aspects that include new knowledge in the knowledge mastered earlier;
- formulate task so that there is a problem that needs to be addressed.
We have developed task systems in stochastics, which enable students to create an image of the concept under study. **Example**: task for study of the properties of various distributions.

The task's essence is:

- to generate random numbers in a mathematical package, distributed according to the normal law and the Cauchy law;
- to present results in graphical form;
- to verify some properties and the Chebyshev theorem experimentally.

**Figure 1. Graphical presentation of the task results**
Conclusions

Results, implementation

It is assumed that as a result of the assignment, students:

- will form images of some fundamental stochastic concepts;
- will learn a new interpretation of previously studied topics (understanding);
- will learn to use the material studied (application).

Conceptual understanding allows students:

- to use alternative approaches to solve the tasks better;
- to apply the knowledge in a new context;
- to estimate the possibilities and limits of statistical methods in the study of real data.
Contacts

Elena Kuznetsova, Natalia Zhbanova
Lipetsk State Technical University
E-mail: eva351@yandex.ru, zbanoid@gmail.com