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STUDENTS' MOTIVATION TO STUDY MATRIX THEORY DURING MASTERING A COURSE OF HIGHER MATHEMATICS

One of the most important problems in the teaching of higher mathematics is the activation of students' cognitive activity during the study of each specific topic of this course. To increase motivation to study the discipline, you have to constantly convince the audience of the need and importance of the knowledge gained. The most common way of doing this is to provide specific examples of applications of knowledge in higher mathematics in various fields of human activity.

In our study of matrix theory, in our opinion, it is useful to provide examples of the application of this theory not only in various sections of mathematics (algebra, geometry, mathematical analysis, probability theory) and the natural sciences (physics, chemistry, biology), but also in the social sciences, such as sociology.

Sociology is a generalizing science that studies the typical, generic, repetitive, time and space processes. Of course, it uses a variety of research methods, including mathematical ones, to achieve its goals. Matrices are an important tool in mathematical research methods. Matrices allow to solve complex problems such as Markov chains, correlations, factor loadings, etc., which play an extremely important role in modern sociology.

To understand the role that matrices play in sociology, one should begin with the second stage of sociological research, namely data collection and processing. The purpose of the data processing step is to create a matrix of data based on primary sociological information for further analysis. In the process of conducting empirical research in accordance with the developed program, the selected units of analysis reveal the properties of social traits (variables). Even with a small number of units of analysis and variables, the amount of information is so large that it is practically impossible to use it without some structuring.

For example, let 1000 respondents be interviewed during an empirical study. Each of them was asked 100 questions. Thus, upon completion of the data collection, approximately 100,000 pieces of information were obtained, which should be sorted in any way for further analysis. The first, purely formal, step is to form a data matrix. In this example, it has 100 columns and 1000 rows. Each row corresponds to some questionnaire and each column corresponds to some specific question.

Matrices in sociology can predict demographics, changes in political attitudes, and other social aspects. Also, sociologists who are interested in different types of communication within a group of individuals often use graphs to represent and analyze relationships within the group. And graph theory cannot do without the use of matrices.

Also important for sociology is game theory, because it can reflect the relationship between different societies. The Nash equilibrium based on the formation of a strategy by another "player of the society" is a prime example of the cooperation of different social units. And of course, matrix modeling optimally covers this.

Summarizing all of the above, we can say that mathematical modeling (using the matrix) of social processes and phenomena is widely used in our lives. Matrices allow someone streamline the sociological information system, identify gaps in the information available, and make requirements for the preparation of new information or its correction. The development and application of mathematical models indicate ways to improve sociological information, focused on solving a particular system of problems.

Due to the use of matrices, the possibilities of specific quantitative analysis and the study of many factors influencing social processes are greatly enhanced. It becomes possible to solve fundamentally new problems. Using mathematical modeling, it is possible to solve problems that are almost impossible to solve by other means.

The field of practical application of matrices is limited by the possibilities and effectiveness of formalization of sociological problems and situations, as well as the state of information, mathematical, technical support of the models used. Trying to apply a mathematical model in any situation may not produce good results due to the absence of at least some necessary conditions. According to current scientific ideas, systems of development and decision making must combine formal and informal methods that complement each other, providing a synergy effect.

References

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Анотація. Сян Муюн, Школьний Олександр. Мотивація студентів до вивчення теорії матриць теорії під час опанування курсу вищої математики. У доповіді представлені різноманітні застосування теорії матриць у соціології, які можуть служити інструментом до активізації пізнавальної діяльності та мотивації студентів до вивчення цього важливого розділу вищої математики.

Ключові слова: активізація пізнавальної діяльності, мотивація до навчання, вища математика, теорія матриць, соціологія.

Summary. Xiang Muyun, Shkolnyi Oleksandr. Students' motivation to study the theory of matrix matrices during mastering a course in higher mathematics. In the report we present various applications of matrix theory in sociology, which can serve as a tool to activate cognitive activity and motivate students to study this important section of higher mathematics.

Key words: activation of cognitive activity, motivation to study, higher mathematics, matrix theory, sociology.

Аннотация. Сян Муюн, Школьный Александр. Мотивация студентов к изучению теории матриц при овладения курсом высшей математики. В докладе представлены разнообразные применения теории матриц в социологии, которые могут служить инструментом для активизации познавательной деятельности и мотивации студентов к изучению этого важного раздела высшей математики.

Ключевые слова: активизация познавательной деятельности, мотивация к обучению, высшая математика, теория матриц, социология.