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METHODS FOR SOLVING A SYSTEM OF EQUATIONS

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Abstract
This article is devoted to studying the didactic and practical possibilities of using the cluster method in solving systems of algebraic equations. The study analyzes the impact of cluster learning technology on the systematization of educational material, the clear reflection of logical connections between concepts, and the deep and conscious assimilation of the subject by students. The importance of the cluster method combined with mathematical modeling in improving the effectiveness of education and the advantages of using it to teach systems of linear equations based on the Cramer, matrix, and Gauss methods are also highlighted. This article is devoted to considering the main possibilities of using the cluster method in methods for solving a system of linear algebraic equations. Particular attention is paid to increased educational efficiency with mathematical modeling based on the cluster method of teaching.

Keywords: Algebraic equations, Cramer, matrix, Gauss, determinant, method, cluster, modeling, analysis, competence.

Introduction

Today's era is characterized by rapid information exchange, active scientific research, and the development of advanced technologies. In particular, the in-depth study of the exact sciences, particularly mathematics, requires high responsibility, consistent thinking, and systematic research. The use of interactive methods in the educational process enhances student activity, allowing them to thoroughly master and consolidate the content of a large amount of educational material in a short time. Therefore, the use of modern teaching methods is an important factor in effectively conveying mathematical knowledge. The Cluster method is one of the effective pedagogical technologies in teaching systems of algebraic equations. This method allows students to clearly see the connections between key concepts, understand them

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systematically, and remember them by schematically illustrating the learning material. Using clusters, complex algebraic relationships are visually represented, which activates students' thinking and helps them to master the subject matter in depth. Below is a description of the three main mathematical approaches to solving systems of linear algebraic equations: Cramer's rule, the matrix method, and the Gauss method. Each of these methods has a separate theoretical basis and differs from each other in terms of the conditions for their application, the accuracy of the solution, and the convenience of the computational process. A comparative analysis of methods helps to choose the optimal approach to solving linear systems and to develop solid mathematical competence in students. Using the "cluster" method to master solving systems of algebraic equations through the algebraic equations system method allows students to systematize their knowledge of the topic, strengthen their skills in working with determinants, and clearly see the logical connection between the steps in the solution process. The algorithm for using the cluster method is based on the following sequential steps aimed at helping students analyze the problem step by step, correctly group key concepts, and consistently understand the principles of applying the Cramer formula. The use of the cluster method of teaching in solving a system of algebraic equations by the Kramer method through mathematical modeling is as follows. The process of choosing the right interactive methods when teaching the Kramer method is of particular didactic importance, as it serves not only to deepen students' understanding of theoretical concepts, but also to develop their competence in applying them in practical situations. In particular, during practical training in mathematics, the system of linear algebraic equations can be written using the Cramer matrix multiplication action to write this equivalent equality: The Matrix method determination using the cluster method of teaching solutions to the system of algebraic equations Ax = b (1.3) is carried out in an orderly, Stepwise and understandable way. The Gauss method for solving a system of algebraic equations can be mathematically modeled using the cluster method. In the process of teaching mathematics, the cluster method helps to overcome obstacles in finding solutions and gradually forms the student's mathematical competence. Solving a system of equations using the matrix method develops the student's competencies, while using the cluster method ensures long-term retention. Solving a system of linear algebraic equations in the Cramer or matrix method sometimes becomes a laborious task, since the Cramer method has to compute n-ordered determinants of N, while the Matrix

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method requires the determination of a high-order inverse matrix to find the solution. It is important to use the Gauss method. By simplifying the system of linear algebraic equations and sequentially eliminating the values of all unknowns, only one unknown remains in the last equation. The system of algebraic equations takes on a triangular form in the Gauss method, which is based on the sequential elimination of unknowns. This process is carried out in several stages. The solutions of the system of linear algebraic equations are determined by the Gauss method. When comparing the methods of solving systems of linear algebraic equations using the cluster method of teaching, it is found that the Kramer and matrix methods are fast and effective in determining the solutions of systems of equations of order n. For a system of higher-order equations, the Gauss method allows for sequential calculation of the values of the unknowns. It was found that the use of modern educational technologies in teaching systems of linear algebraic equations in higher education institutions, in particular, the use of modeling processes based on cluster learning, serves to increase the effectiveness of the educational process. Methodological recommendations have been developed for systematic teaching methods for solving systems of equations, their application in practical exercises, and the formation of independent thinking skills in students. Interactive methods related to the topic, including the cluster method, Cramer's rule, the matrix method, and the Gauss method, were improved based on the models of the pedagogical process of an integrative approach to teaching together. This approach allowed for the content structuring of the educational material, highlighting interdisciplinary connections, and creating an effective learning environment that helps students gain a deeper understanding of the subject. This not only improves the quality of the lesson process, but also plays an important role in strengthening students' theoretical knowledge, developing practical skills, and expanding their mathematical thinking.

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