

The Infiltration of Mathematical Modeling Thought in Advanced Mathematics Teaching

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Key words: higher mathematics teaching; mathematical modeling; thought

Abstract: Infiltrating the thought of mathematical modeling into the course of higher mathematics teaching is the most important idea at present. It plays a leading role in improving the teaching environment and teaching efficiency of mathematics classroom. Since the reform of higher mathematics in China after the new curriculum, the advantages and development trend of infiltrating mathematical modeling ideas for higher mathematics teaching is more obvious, so the reform of mathematics teaching is becoming urgent. In the advanced mathematics development and application of mathematical modeling ideas, at this stage of understanding is still relatively superficial, so there is the need for continuous improvement and practice. The paper expounds the necessity of infiltrating into the teaching of higher mathematics and the principles and strategies of infiltration of mathematical modeling in order to enhance the students' ability to apply mathematical methods, ideas and knowledge to deal with problems.

Introduction

Higher mathematics is a required course of different majors of science in universities. It has a wide range of applications in economy and engineering. Also, it is an important tool to enhance the level of specialized courses and to analyze the economic and working phenomena. However, at present, higher mathematics still use the traditional teaching methods and teaching patterns, exposing some problems, leading students to boredom for learning higher mathematics. Higher mathematics in improving the ability of students to deal with problems and thinking ability, is not replaced by other disciplines. China's College Curriculum Steering Committee on the learning of higher mathematics: to improve the ability of students to deal with problems through the computer and the ability to build mathematical models of training. Based on this idea, colleges and universities to adjust the high number of learning content and learning methods is particularly necessary. Infiltrating mathematical modeling ideas into the teaching of higher mathematics and using new teaching methods and ideas to enhance the attractiveness of higher mathematics are good way to enhance the quality of classroom teaching and results.

The Concept and Connotation of Mathematical Modeling

A mathematical model is a mathematical structure that is established by a suitable mathematical tool for a specific object, a simplified hypothesis designed to achieve a particular goal, according to its unique internal laws. The process of designing and building a mathematical model is called mathematical modeling. It involves the steps of asking questions, model assumptions, establishing models, analyzing models, checking models, and applying models. Mathematical modeling is a bridge between practical problems and mathematical problems. It is a scientific method to analyze and deal with practical problems by means of mathematical tools. It is an important medium for the popularization and application of mathematics in different fields, and it is also an effective channel for the transformation of science and technology. At present, the advantages of mathematical modeling gradually gain the attention of all sectors of society.

Mathematical modeling is to simplify the complex problem, and the mathematical modeling in the consciousness is called the mathematical modeling thinking, including the application consciousness, innovation consciousness, transformation consciousness, practice consciousness, model consciousness. Application consciousness is the use of mathematical methods and mathematical knowledge to deal with the problem consciousness. Application is the main purpose

of learning scientific knowledge, and mathematics is applicable, universal and important technology. Therefore, the model should have application consciousness. Innovation consciousness is to deal with problems in the application, results, methods, knowledge and other aspects to be innovative, and then making the analysis, to solve new problems, innovation should have deep, solid foundation with a flexible use of capacity and the courage to innovate ideas. Transformation consciousness is the practical problem is to change the mathematical problem, the model analysis data to explain the practical problems of ideology. It is particularly important to use mathematical language instead of descriptive language to transform the actual problems of life into mathematical ideas. Practical consciousness is a way to connect reality with theory, to achieve mathematical knowledge in life, engineering applications. People in the process of the analysis of practical problems obtaining mathematical knowledge, and the correctness of mathematical theory can not be separated from the test of practice, if the theory out of practice there will be "mathematics useless" situation. Modeling consciousness is the idea of modeling and symbolizing practical problems, generalizing abstract problems to ordinary situations, constructing mathematical models and proposing solutions, and then obtain general conclusions, reflecting the universal significance.

The Importance of Infiltration of Mathematical Modeling Thought into Higher Mathematics Teaching

Mathematical modeling can deal with practical problems by means of mathematical methods, symbols and language, and can effectively improve students' interest in learning and cultivate students' initiative, exploration and solidarity. When exploring and solving problems, they can improve their innovative ability, to cultivate more high-quality, complex talents.

2.1 To stimulate students to learn initiative

In the course of higher mathematics teaching, if there is no scientific orientation and correct cognition, it will cause students to lack of clear learning motivation and reduce interest in learning. In solving practical problems, it is difficult to broaden the thinking and ability to deal with problems. Infiltration the mathematical modeling ideas into the higher mathematics classroom teaching, students can correctly understand and scientific positioning higher mathematics, understanding the theorem and conceptual knowledge, and practical application of the effective use of the above knowledge. The mathematical modeling ideas into the higher mathematics teaching can better stimulate student learning initiative and learning enthusiasm for students to actively think and learn all kinds of knowledge, effectively enhancing the quality of teaching efficiency .

2.2 To enhance students' mathematics quality

At present, the scientific and technological level gradually increased, the community needs more professional quality and comprehensive ability talents. So college students not only master the professional knowledge, have the ability to carefully analyze the problem, properly solve the problem, but also have strong practical ability and organization management capacity, so as to meet the work requirements. The use of mathematical modeling ideas in the higher mathematics teaching to enhance the level and their overall quality of professional mathematics students. In addition, the mathematical modeling ideas infiltrated into the teaching of higher mathematics is a good way to help students to promote the practice and the integration of theory. In the process of building mathematical models, students can enhance the ability to use mathematical knowledge and practical ability, and comprehensively enhance the overall quality of students.

2.3 To help students develop innovative ability

The modeling thought emphasizes how to solve the practical problems, and can help students to cultivate and improve the spirit of innovation, and to enhance the sense of innovation and ability in the process of practice. Mathematical modeling activities in colleges and universities require each student to analyze, explore and solve the problem, and then achieve the purpose of mathematical model. In higher mathematics teaching practice, students have more thinking time and space, in order to enhance students' innovative consciousness and lay a good foundation, in addition, to fully embody the characteristics and advantages of students and to find the inherent potential of students, properly solve specific and abstract problems.

Principles and Tactics of Mathematical Modeling Infiltration in Higher Mathematics Teaching

To enhance students' mathematical quality is the purpose of higher mathematics teaching, with the help of higher mathematics teaching is a good way to enhance students to mathematical methods and ideas to study and solve problems. The application of mathematical modeling in teaching higher mathematics is an important way to achieve this goal. Mathematical modeling to comply with the "five not five" principle, based on scientific strategies to obtain better results.

1. To straighten out the relationship between application problems and mathematical theory. Higher mathematics is a lot of professional basic courses, not as a mathematical modeling course to organize and carry out the contents of the syllabus to the quality of the completion of mathematical modeling ideas. It is based on the theory of mathematics, and its purpose is to apply, in addition, its way is infiltration, so the lack of theoretical knowledge is difficult to achieve innovation in the application. 2. It is necessary to integrate the teaching content of higher mathematics and mathematical modeling ideas, rather than mechanical, blindly increase the modeling case. We can not blindly pursue the formation of the system, seek all the big, constantly stretched length, increase the content, resulting in poor teaching results. 3. Mathematical modeling thinking infiltration into the higher mathematics teaching can be gradual, and its content from shallow to profound, from simple to complex, timely infiltration and in-depth. 4. The case of mathematical modeling can be different according to different students and professional to mobilize the enthusiasm of students learning and specialization. 5. According to the content and core idea of the higher mathematics of courses, we can infiltrate the idea of modeling into the theoretic explanation and the conceptual exposition, and constantly tap new ideas.

First, to establish clear teaching objectives. Higher mathematics teaching not only impart knowledge of mathematical concepts, but also develop students to use knowledge to deal with practical problems, higher mathematics teaching for other disciplines to lay the logic of reasoning, scientific computing foundation, but also attention to enhance students' creative consciousness and innovation, to develop students through the number of strategies to deal with problems with the ability. The study of higher mathematics can help students from qualitative analysis and quantitative analysis to find mathematical laws, effectively deal with practical problems.

Second, to emphasize modeling ideas and teaching methods. Infiltrating mathematical modeling ideas into the higher mathematics teaching, not just the transfer of theoretical knowledge, but also allow students to learn the use of mathematical methods to understand the nature of mathematics to solve practical problems for teaching purposes. Therefore, mathematical modeling is the bridge of mathematical theory connected with the real life. Such as learning the concept of integral course, extended out from the speed of linear motion, curved trapezoidal area and other issues. With the help of the definite integral model, we can deal with such problems as optimization of commodity storage cost, unit flow rate, volume of rotating body, also, mathematical modeling method can analyze mathematical theorems, formulas, concepts, so that students study the mathematicians of the analysis process, which not only to help students grasp the knowledge content, but also expand the students vision, to mobilize their interest in learning, to lay the foundation for practical problems after graduation.

Third, to improve teaching methods and to mobilize students learning initiative. Higher mathematics teaching has the characteristics of abstract teaching, strong theoretical, less time, more content, most students feel dull and boring, which can not afford to learn interest. Reform and improvement of the current teaching methods to stimulate students to learn enthusiasm, it is necessary to reflect the dominant position of teachers, but also reflect the main function of students to encourage students to take the initiative to actively ask questions, explore the problem, and then solve the problem. Considering the problem as the starting point of teaching, the process of creating the situation in the challenging, enlightening and forward-looking issues, make students experience observation, analysis, analogy, discovery of the analysis process, through collaborative approach, and then complete the teaching objectives. In addition, the traditional teaching and multimedia teaching should be combined, so that the higher mathematics teaching can be more vivid.

Finally, to penetrate the mathematical modeling ideas into the assessment and evaluation. The infiltration of idea of mathematical modeling into the higher mathematics curriculum assessment, through the "extra points" means to monitor the students team or to solve problem by themselves. This method not only guide students to study and apply mathematics knowledge, but also effectively enhance the spirit of unity and cooperation and explore the spirit, creativity and thinking ability of students. The focus of the higher mathematics of courses is not modeling. It is important to integrate the idea mathematical modeling into the higher mathematics teaching, to help students better master the knowledge and to enhance students ability to deal with problems. The examination method should change from the traditional single closed examination to the diversification examination. In particular, we should respect the individual differences and individual abilities among the students. We should comprehensively analyze the students' innovation ability, and examine both the basic mathematics knowledge through the open examination questions.

Conclusion:

Higher mathematics teaching can enhance the students' mathematics quality. With the combination of mathematical modeling and higher mathematics teaching, students' understanding of higher mathematics knowledge can be strengthened, and students' ability of using higher mathematics theory knowledge can be greatly enhanced. At the present stage, in the teaching process of higher mathematics teaching, we must pay attention to the infiltration of mathematical modeling thought, to establish clear teaching goal, to attach importance to integrating modeling thought and introduce teaching method, to perfect teaching method, to arouse students' learning initiative, to infiltrate to the assessment, evaluation of medium-level strategy, to improve the teaching mode, to promote the effective implementation of teaching content, to achieve the expected teaching objectives, and then to enhance the high number of "teaching" and "learning" level.

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