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## Exploration of the education of the mathematical modeling competition and the personnel cultivation in information technology

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### ABSTRACT

In recent years, with the rapid economic development, the talent cultivation with modern education has gradually tended to cultivate the innovative applied talents, especially today, the current knowledge and economy develop rapidly, and the talent competition is increasingly fierce. But the mathematical contest in modeling as a special education require students to have not only a solid theoretical and professional knowledge, but also the strong innovation ability and practice ability, etc., and how to do the education of the mathematical contest in modeling well and the personnel cultivation in the information technology becomes one of the hot topics in today's education industry research. This paper firstly illustrates the education of the mathematical contest in modeling and the personnel cultivation in the information technology when exploring them, then analyzes the beneficial aspects and the demonstration effect of the mathematical contest in modeling, and finally discusses and concludes the effect of the education of mathematical modeling competition and the personnel cultivation in the information technology.

### KEYWORDS

Education of the mathematical contest in modeling; Information technology; Personnel cultivation; Effect.



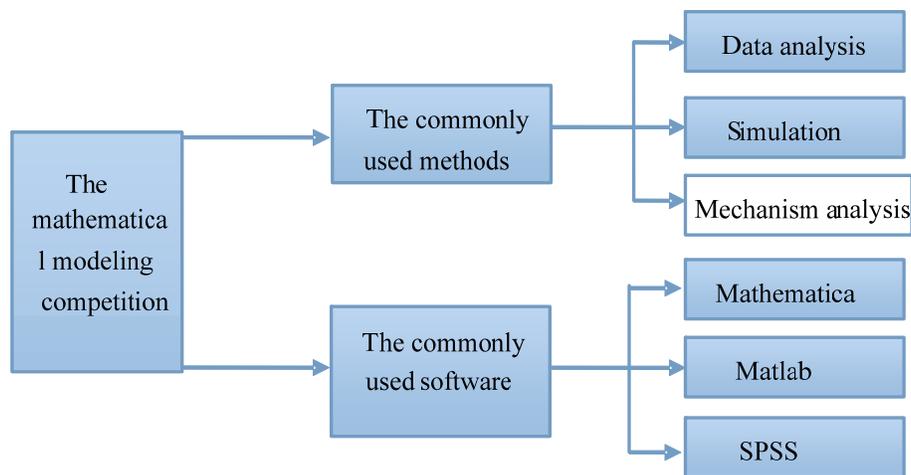
## INTRODUCTION

In the 21st century today, the era economy develops diversified, and at the same time, the talent competition in the market economy gradually increases, so if the contemporary college students want to be among the rapidly developing talent market in the economy, they not only has a solid theoretical basic knowledge, but also has a strong ability to innovate and practice. Especially with the rapid development of information technology, nowadays, the goal of personnel cultivation in the mathematical contest in modeling is more tend to cultivate the applying talents who are more quality, innovative and comprehensive. Mathematical modeling is the corresponding mathematical modeling activities knowledge with the sublimation and summarize of plates knowledge after learning the content of each chapter, it can help students take mastery of knowledge. While this background knowledge also determine what kind of problems should choose during the design of the establishment of mathematical teaching mode. When teachers conducting mathematical modeling, they should have an accurate grasp of the master degree of student's basic knowledge background of mathematics and mathematical basic skills at this stage, Only in this case, during the mathematical model of teaching, can it "individualized" give mathematical model scenarios which suitable for students background knowledge. So in this paper, there are theoretical basis and practical significance to explore and analyze the education of the mathematical contest in modeling and the personnel cultivation in information technology.

### THE RELATED DESCRIPTION ABOUT THE MATHEMATICAL CONTEST IN MODELING EDUCATION AND THE INFORMATION TECHNOLOGY

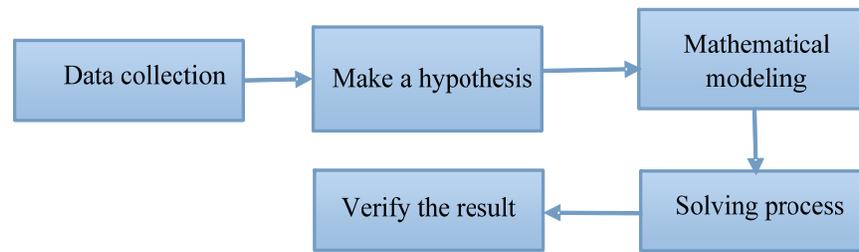
With the rapid development of the era and the economy, the mathematical contest in modeling, as an activity which solves practical problems by means of mathematics knowledge, has been paid much attention by people. However, along with the rapid development of information technology, the cultivating goal of current college students' education of the mathematical contest in modeling has gradually changed greatly. The mathematics software and the computer technology develop simultaneously, which not only provides students with the necessary material conditions to learn the computer mathematics, but also at the same time has a certain positive impact on the cultivation of the students' operational and thinking ability.

As one kind of the national mathematical contest in modeling <sup>[1-3]</sup>, the mathematical contest in modeling is a competition actually, which was founded in 1992, is a basic subject contest, and is held in September each year. With the aid of mathematical thinking way, it utilizes the languages and methods of mathematics, and then solves the practical problems in reality. The main purpose of the competition is to enhance the college students' ability to solve the practical problems and increase their awareness, and to cultivate the students' cooperative and innovative ability. In terms of its essence, in the process of the mathematical contest in modeling, the commonly used methods are data analysis, simulation and mechanism analysis, and the commonly used software are mainly Mathematica, Matlab, SPSS and so on, as shown in Figure 1.



**Figure 1 : The Methods and the Commonly Used Software in the Mathematical Modeling Competition**

In the process of mathematical modeling, the cultivation of the talent in information technology has often and indispensable and direct relationship with the practical application of mathematical modeling. The so-called mathematical modeling is mainly by means of applying knowledge to do abstract fiction for the practical problems, and then refine the mathematical model. In terms of its essence, there are certain steps for mathematical modeling. First, it needs to collect the data about the entity information, and with the help of the actual situation, make a relevant hypothesis. Under the condition of the hypothesis, it needs to process the modeling, so that obtain the solving process, and finally, it needs to verify the results of the modeling, as shown in Figure 2.



**Figure 2 : Procedures of Mathematical Modeling**

The topic of the actual content of the mathematical contest in modeling is mainly simplified from the practical problems in management science and engineering technology, and there is no standard answer in the process of competition so that the participants explore the result with their own intelligence and the creative spirit. The form of the competition is that, three students constitute a group firstly, collect the data and do a survey, and then seek for the answers with the aid of computer, Internet and other software, and complete the thesis in the three days as soon as possible. The subject of the competition is to cultivate students' consciousness of innovation, team spirit and ability to think independently and so on.

All in all, in the process of actual development, both the mathematical modeling education and the computer technology are special methods with the aid of mathematical language and knowledge to solve the practical problems in people's economic society, and their application range are relatively broad.

#### **ANALYSIS ON THE BENEFITED ASPECTS AND THE DEMONSTRATION EFFECT OF MATHEMATICAL CONTEST IN MODELING**

Generally speaking, the national college students' mathematical modeling competition has certain fairness and freedom, and it is a kind of communication contests mainly in the face of college students with different kinds of major in all colleges and universities. Related studies have shown that <sup>[4-5]</sup> 92% of the participants of the mathematical contest in modeling in 2012 were from non-mathematical major in all kinds of colleges and university in China, and 2% of them came from the humanities and social science. Through dividing the undergraduates and junior college students into two groups, and with the aid of information technology, the website was established, and then some propaganda work was done and it reaped a good harvest.

Research has shown that <sup>[6]</sup> mathematical contest in modeling is a discipline competition with a long history in the university of China, and the national competition organizing committee held the two sessions of the national college mathematical modeling summer camp in 2008 and 2012 respectively. The number of participants was 150, and it lasted 5 days. In the summer camp, all participants learned from each other by exchanging views and benefited a lot.

The mathematical modeling is a discipline competition which was held relatively more times. From this, it can be seen that the cultivation of students' ability of innovation is particularly important, and its aim in general is in line with the theme of innovation and solidarity, which provides relevant experience for other related discipline competitions and actively promotes the healthy development of the college students' discipline competition.

#### **THE EFFECT OF THE EDUCATION OF THE MATHEMATICAL MODELING COMPETITION AND THE PERSONNEL CULTIVATION IN INFORMATION TECHNOLOGY**

High school mathematics courses require that permeate mathematical inquiry, the idea of mathematical modeling in different forms into the various modules and themes, at least once a more complete exploration of mathematics during high school. A well teaching aspects establishment of mathematical modeling of "the new curriculum standards" can help students generate the proactive and diverse learning styles. It also can stimulate students' interest in learning mathematics, and develop independent thinking, and actively explore habits.

In the information age, the economy develops diversified, and at the same time, the education of the mathematical modeling competition as a kind of special education has a direct impact on the basic direction of the personnel cultivation in the current university. Nowadays, under the information technology development, the study of any disciplines has certain requirements for students' ability to apply for the computer, and has relatively high requirements for students' comprehensive quality. Generally speaking, in the process of mathematical contest in modeling, the first embodiment is the innovative quality education, and the second one is to cultivate the students' interest in computer science learning.

#### **The education of mathematical contest in modeling promoted the innovation quality education**

In the process of the actual development, the education of mathematical contest in modeling mainly adopt the autonomous learning mode with goal orientation, and the students who take part in the mathematical contest in modeling have not only a strong ability to learn, but also a good mathematics theory foundation and a strong ability to program, so that their learning goal is clear.

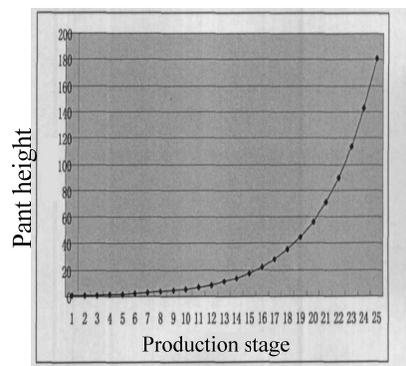
But most participants are some junior grade majoring in science and engineering and economics, and most of the students just have a little understanding for the mathematics, C language, probability theory and data structure. But in the process of the actual competition, it often needs to learn the knowledge of the economics, mathematics, operational research, social science and computer science, and the realization of this process has certain positive impact on the promotion of the students' overall knowledge skills.

**TABLE 1 : Data statistics from the combination of mathematical contest modeling education and IT**

Production stage	1	2	3	4	5	6	7	8	9	10
Pant height	0.67	0.85	1.28	1.75	2.27	2.75	3.69	4.71	6.36	7.73
Production stage	11	12	12	14	15	16	17	18	19	20
Pant height	9.91	12.75	16.55	20.1	27.35	32.55	37.55	22.75	53.38	71.61
Production stage	21	22	23	24	25	26	27	28	29	30
Pant height	83.89	97.46	112.7	135.1	153.6	160.0	174.9	177.8	180.1	180.7

At the same time, the education of the mathematical contest in modeling pays more attention to team collaborative learning mode. There are mainly three competitors for the same title, and the paper needs to be done in 3 days. By collecting the data and doing a lot of exploration and analysis in the process of completing the paper, and with the clear division of task, the task can be completed fundamentally. The realization of this process has certain positive impact on the promotion of students' cooperative and individual consciousness.

The education of mathematical contest in modeling, in the process of actual development, also has certain mode of using the innovation ability to manage the personnel cultivation and the self-cultivating mode using scientific research quality. In terms of the mode of using the ability of innovation to cultivate personnel, it has a certain creative consciousness for encouraging students to study in the actual process. The process of exploring and answering the problems not only fully arouses students' interests, but also adopts the task-driven mode, so that in the process of students solve the actual problems, the relatively perfect mathematical model is established and the problems are analyzed and explored comprehensively, and finally the correctness of the issue is ensured. At the same time, it is the so-called self-cultivating mode with scientific research. The mathematical contest in modeling not only has certain challenges, but also is more likely to meet the college students' desire to win. In the process of the actual participation, the participants comprehensively analyzed all kinds of knowledge structure, and improved their mathematical modeling ability, logical reasoning ability and abstract thinking ability. The topics of the competition were mainly adopting the model without fixed solution. This measure had certain positive effect on the cultivation of students' practical scientific attitude, and ensured that participants had optimistic attitude, which also had an impact on promoting the cultivation of flexible mind for the contestants (shown in Figure 3).

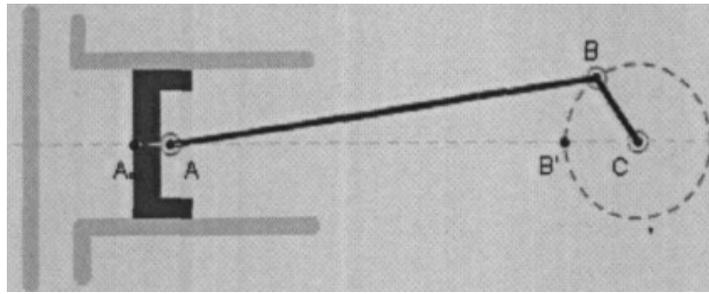


**Figure 3 : Students mathematical model data processing**

**The mathematical contest in modeling computer cultivated the students' interest in learning the computer science**

The unique content and pattern of the mathematical modeling competition education, in the process of practical training, mainly combines the knowledge between the mathematics and computer science, and then adopts it in the mathematical modeling, which not only strengthens students' understanding and study, but also involves more relevant discipline knowledge into the topics of the competition. Besides, the questions of the competition cover the program design, algorithm analysis design, discrete mathematics, data structures, and calculating geometry. In the process of the mathematical contest in modeling education, practical problems can be solved with the aid of comprehensive knowledge, and then the students' enthusiasm of learning computer will be enhanced (shown in Figure 4).

Drag and rotate this point  
to take demonstration



**Figure 4 : Piston connecting rod movement trajectories production**

The applications of calculators and computer algorithms make a lot of problems to solve become simple. Many calculations, no longer rely on pen and paper to carry out. For example, in the New Curriculum mathematics compulsory on the books (A version) describes the methods used IT to solve the equation. Similar equations are solved in the future can follow this way. We should advocate the use of a calculator or computer, help students understand mathematical concepts, explore mathematical conclusions, also should encourage students to use modern technology to handle complex calculations to solve practical problems, which can get more time and energy to explore and discover the laws of mathematics, to culture innovative spirit and practical ability.

To sum up, the education of the mathematical contest in modeling bases on the development of the information age. Its special competition form and content not only cultivated the students' ability of practice but also the ability of innovation. Its topic design is more associated with the real life to solve problems in life, and then comprehensively utilizes the multidisciplinary application knowledge to improve students' comprehensive quality and ability. The process of the mathematical contest in modeling education and the talent cultivation in information technology has promoted not only the reform of mathematical education in colleges and universities of China, but also teaching and research as well as the growth of the teachers.

## CONCLUSION

Today, in the 21st century, the social economy develops rapidly, and modern talent market has higher requirements for the college students. It requires college students have not only the professional theoretical foundation knowledge, but also the comprehensive ability of innovation, practical ability and problem solving ability, while the process of the mathematical contest in modeling education and the personnel cultivation in information technology has not only paid much attention to students' ability of innovation, but also had a certain concern about students' practical ability, independent thinking and problem solving ability. Besides, the process of the education of mathematical contest in modeling not only has promoted the development of the mathematics education reform in China, but also has established a creative and comprehensive education mode of personnel training, and then has benefited the overall development of the whole education situation in China.

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