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# International Journal of Mathematics and Systems Science

## —— Educational Systematics

11

2024 Volume 7 Issue 11
ISSN: 2578-1839

ISSN 2578-1839
11
9 772578 183072

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Volume 7 Issue 11·2024
EISSN: 2578-1839

# International Journal of Mathematics and Systems Science



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2024 | Volume 7 | Issue 11

International Journal of Mathematics and Systems Science

https://systems.enpress-publisher.com/index.php/IJMSS

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# Research on the talent training mode of integration of industry and education in international Cruise Crew management under the "1+X" certificate system

**Yan Liu**

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***Abstract:*** The introduction of the "1+X" certificate system has put forward more new requirements for the training of international cruise crew management professionals in Chinese undergraduate colleges. Based on the requirements of the "1+X" certificate system, the integration of production and education has become an important path to cultivate high-quality and practical talents. Based on the talent training model of integration of production and education, this paper explores the impact of the "1+X" system on the talent training of undergraduate international cruise crew management majors, and puts forward three feasible suggestions, hoping to provide more references for the innovation and development of this major.

***Keywords:*** 1+X Vocational Skill Certificate System; International Cruise Crew Management; Integration of Production and Education; Personnel Training

## Introduction

With the vigorous development of the global tourism industry, the international cruise industry as a new field, the demand for professional personnel is increasing. The establishment of the undergraduate international Cruise Crew Management major aims to provide talents with high comprehensive quality and professional ability for the industry. The implementation of the "1+X" certificate system provides a new opportunity for deepening the integration of production and education and innovating the mode of personnel training. However, in the current practice of talent training, the integration of production and education still faces many challenges. Therefore, it is of great theoretical value and practical significance to deeply study the talent training mode of integrating production and education in international cruise crew management under the "1+X" certificate system.

## 1. "1+X" certificate system under the international cruise crew management professional integration of the necessity

### 1.1 Optimize the traditional professional personnel training model

The traditional training mode of international cruise crew management professionals often focuses on the teaching of theoretical knowledge, which is out of touch with the actual work scene. Under the "1+X" certificate system, the integration of production and education has become the key to optimize this model. By closely integrating industry needs with teaching, students are able to practice learning in a real working environment, not only mastering theory, but also accumulating practical experience. This integration helps to break the gap between theory and practice in the traditional model, so that the talents cultivated are more in line with the needs of the industry.

### 1.2 Promote teaching reform to meet the needs of the new era

With the continuous development and changes of the international cruise industry, the requirements for crew management personnel are also increasing. The integration of industry and education under the "1+X" certificate system can promote the teaching reform and make it better meet the needs of the new era. The latest technologies, concepts and standards of the industry can be integrated into the teaching content in time to promote the updating of teaching methods and means. At this time, the school can adjust the curriculum and teaching focus according to the dynamic situation of the industry, thus providing strong support for the innovative development of the international cruise industry [1].

## 2. Analysis of talent training mode of integration of industry and education in international cruise Crew management under the "1+X" certificate system

### 2.1 Teaching objectives have been adjusted

Under the guidance of the "1+X" certificate system, the teaching objectives of the international cruise Crew management major have been significantly adjusted. It is no longer limited to teaching theoretical knowledge, but pays more attention to cultivating students' comprehensive professional ability. On the basis of obtaining the "1" academic certificate, students are encouraged to obtain a variety of "X" vocational skill level certificates, so that students have a wider range of vocational skills and adaptability. This adjustment is designed to enable students to quickly adapt to the working requirements of different positions after graduation and lay a solid foundation for their career development.

### 2.2 Optimization of teaching methods

The integration of production and teaching promotes the continuous optimization of teaching methods. It is no longer a single classroom teaching, but the introduction of project-driven, case analysis, scenario simulation and other diversified teaching methods. By working with companies on practical projects, students learn and apply knowledge in practice. Case studies enable students to draw lessons from real business cases, while scenario simulations allow students to experience work scenarios in advance and improve their ability to deal with real problems. These optimized teaching methods enhance students' learning enthusiasm and initiative, and improve the teaching effect.

### 2.3 Innovation in teaching content

Under the influence of the talent training mode of the integration of production and education and the "1+X" career system, the teaching content has undergone innovative changes. No longer just rely on traditional teaching materials, but the actual work tasks of enterprises, the latest technology and standards of the industry into the teaching. The teaching content is more close to the actual work needs, covering cruise service process optimization, customer relationship management innovation, emergency incident handling and other aspects. At the same time, with the development of the industry, the teaching content is constantly updated and supplemented to ensure that the knowledge and skills learned by students always keep pace with the forefront of the industry [2].

### 2.4 Teaching evaluation has been improved

Under the mode of integration of production and education, the teaching evaluation system has been perfected. Instead of relying solely on test scores to evaluate students, students' performance in practical projects, evaluation during corporate internships, and the acquisition of vocational skills certificates are considered comprehensively. Enterprise mentors and school teachers participate in the evaluation, so that the evaluation is more comprehensive, objective and fair. This perfect evaluation system can more accurately reflect the true level and ability of students, and provide more targeted guidance for students' career development.

## 3. Optimization strategy of talents training mode of integration of production and education in international cruise Crew management under the "1+X" certificate system

### 3.1 Optimize, innovate and reform education resources, improve the content of teaching courses and teachers

In order to improve the quality of personnel training for the international cruise crew management specialty, it is necessary to optimize and innovate the education resources. In terms of teaching course content, in-depth investigation of industry needs and development trends, the latest industry standards, service concepts and technology applications into the course system. Cooperate with enterprises to develop practical course modules, such as cruise emergency response, high-end customer service skills. At the same time, strengthen the construction of teachers, on the one hand, encourage teachers in the school to take temporary training in enterprises, understand the actual operation of the industry, and improve practical teaching ability; On the other hand, senior experts from enterprises are hired as part-time teachers to impart front-line work experience and practical skills to students. Through these measures, we ensure that the teaching content is closely linked to

the industry, and the teachers have rich practical experience and teaching ability.

### 3.2 Build a complete "1+X" certificate incentive system and improve the effectiveness of "1+X" certificate

The school should set up special scholarships or honorary titles to commend and reward students who actively obtain the "X" certificate to stimulate students' learning motivation. At the same time, we will cooperate with enterprises to provide preferential internship, employment and promotion opportunities for students who hold relevant certificates, so as to enhance the practical utility of certificates. In addition, strengthen the publicity and promotion of certificates, so that students fully understand the value and role of certificates, and guide more students to participate in certificate training and assessment. By building an incentive system and creating a good learning atmosphere, students' enthusiasm to obtain certificates is enhanced and their employment competitiveness is enhanced [3].

### 3.3 Improve the professional talent evaluation mechanism for the integration of production and education of international cruise crew management

In order to promote the in-depth development of the integration of industry and education in international cruise crew management, it is necessary to establish a perfect professional talent evaluation mechanism. The mechanism should comprehensively consider students' academic performance, practical ability, professional quality and other aspects. In terms of academic performance, attention should be paid not only to the mastery of theoretical knowledge, but also to the performance of practical courses and project results. The evaluation of practical ability can be carried out through the performance of enterprise practice and the examination of practical operation skills. The evaluation of professional quality includes teamwork spirit, communication ability, service consciousness and so on. In addition, third-party evaluation agencies are introduced to ensure the objectivity and impartiality of the evaluation. The evaluation results should be timely fed back to students to provide personalized development suggestions, and also provide a basis for schools and enterprises to improve talent training programs. Through improving the evaluation mechanism, the quality of personnel training is constantly improved to meet the demand for professional talents in the international cruise industry.

## Conclusion

To sum up, the "1+X" certificate system has brought new opportunities and challenges to the talent training mode of the integration of production and education for the international cruise crew management profession. Through the analysis of this paper, a series of strategies and methods aimed at strengthening the integration of industry and education are put forward. By promoting the integration of production and education as the core and realizing the innovation and optimization of talent training programs, more outstanding talents can be cultivated for the international cruise crew management major to meet the needs of the industry.

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# The Generative Logic, Unique Connotation and Value Implications of the Road of Chinese Modernisation

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***Abstract:*** The path of Chinese-style modernisation is a great miracle in the history of the development of the Chinese nation and even the human society, and the generation of Chinese-style modernisation reveals three major logics, namely, the logic of history, the logic of theory and the logic of practice. Based on the national conditions of China, the theory of Chinese-style modernisation has unique connotations in five aspects: the main body of modernisation, the goal of modernisation, the support of modernisation, and the path of modernisation, which demonstrates the confidence in the road, the theory, the system, and the culture, and provides a fundamental guideline to promote the great rejuvenation of the Chinese nation, and contributes to Chinese wisdom to answer the problems of mankind, the global issues, and the world problems.

***Keywords:*** Chinese-style Modernisation Path; Generative Logic; Unique Connotation; Value Implication

## Introduction

General Secretary President Xi has repeatedly mentioned that the Communist Party of China (CPC), after decades of efforts, has explored a Chinese-style modernisation path that suits China's national conditions. Rooted in socialist modernisation with Chinese characteristics and wandering amidst the diversity of modernisation in the world, this path is of great theoretical and practical significance for promoting the great rejuvenation of the Chinese nation and realising the Chinese dream.

## 1.The Generative Logic of Chinese Modernisation Path

### 1.1 The Communist Party of China's arduous exploration of the road to modernisation has formed a historical logic.

Firstly, the Chinese-style modernisation path is the CPC's arduous exploration of the road to modernisation. During the New Democratic Revolution, the CPC led the entire people to end the history of exploitation and enslavement, and completely overthrew the semi-colonial and semi-feudal history of old China. In the new period of reform, opening up and socialist modernisation, Comrade Xiaoping put forward "Chinese-style modernisation" and the "three-step" development strategy, laying a solid institutional guarantee and material foundation for the rapid development of Chinese-style modernisation. Since the 18th CPC National Congress, the Party Central Committee, with Comrade President Xi at its core, has united and led the people of all nationalities to continue to explore on the basis of the existing foundations, and to make continuous innovations in theory and breakthroughs in practice.

Secondly, the formation of the Chinese-style modernisation path is a profound critique of the capitalist modernisation model. The capitalist model of modernisation is to maximise one's own interests in the short term by exploiting workers and oppressing other countries and peoples. For the big Eastern countries, which are politically, economically and culturally backward, to change this starving situation and achieve national wealth, national revitalisation and people's happiness, we must abandon the erroneous models of the Western countries, and always explore a road that meets China's national conditions from the perspective of our basic national conditions.

### 1.2 The CPC's inheritance and development of the Marxist theory of modernisation has formed a theoretical logic.

Firstly,The path of Chinese-style modernisation is an adherence to and inheritance of Marxist theory. The Marxist theory of modernisation, which is based on social equity and public ownership, has shown the way for the exploration of Chinese-style modernisation and has become the theoretical precursor and theoretical cornerstone of Chinese-style modernisation. It also tells us that as long as backward countries take into account their own actual situation, we may be able to cross the Kaftin Canyon and directly embark on the road of modernisation in line with our own national conditions.

Secondly, the path of Chinese-style modernisation is the promotion and development of Marxist theory. First, in the process of socialist construction, China has been adept at studying and applying Marxist theory to identify, analyse and solve the difficulties and problems encountered in the development of the Chinese revolution. Secondly, the Chinese Communists are good at combining Marxist theory with the reality of the Chinese revolution to solve the problems encountered at present; they are also good at combining it with the excellent traditional Chinese culture to promote the essence of the Chinese culture and continue to push forward the development of socialist modernisation with Chinese characteristics.

### 1.3 The Communist Party of China's great exploration of modernisation has formed a practical logic.

Firstly:The path of Chinese-style modernisation is rooted in the great practice of the new era. Since the 18th National Congress of the Communist Party of China (CPC), General Secretary President Xi has comprehensively and profoundly elaborated the significance of Chinese-style modernisation, leading the people of the country to move forward, and we have achieved precise poverty eradication, built a moderately prosperous society that is pleasant to live in, pleasant to work in, and beautiful to live in, and solved the problem of absolute poverty, which is an important milestone in the process of China's modernisation construction. The resolution of the Sixth Plenary Session of the 19th CPC Central Committee put forward the important assertion of "two establishments", leading the people of the country to achieve the overall goal of stable economic growth, people's well-being and social peace and stability, and the people of the country's sense of happiness and a sense of achievement.

Secondly, the path of Chinese-style modernisation aims to achieve the great rejuvenation of the Chinese nation. On the one hand, it signifies that China has found a correct path to achieve the great rejuvenation of the Chinese nation in line with China's national conditions; on the other hand, it signifies that we have made China's contribution to the advancement of human civilisation, that is, "a form of material civilisation with common prosperity, a form of spiritual civilisation with cultural confidence, and a new form of social civilisation with openness, win-win situation and inclusiveness". ".

## 2. The unique connotation of the Chinese-style path of modernisation

The path of Chinese-style modernisation is neither a rigid copy of the Western modernisation model, nor a figment of the imagination of the classic Marxist writers, but a modernisation with Chinese characteristics, which not only contains the common features of modernisation of all countries, but also has Chinese characteristics based on its own national conditions. The five unique connotations of Chinese-style modernisation.

### 2.1 Chinese modernisation is a modernisation of a huge population.

The first and foremost task in achieving Chinese-style modernisation is to give priority attention to human development, so that the people can have enough to eat and wear, so that their children can receive a good education, and so that their standard of living can steadily rise and their quality of life can be improved. At the beginning of the founding of New China, the country's population of more than 500 million had an education rate of only about 26 per cent. Entering the new era, the country's school enrolment rate has reached 99.9 per cent, and the quality of the population continues to improve. Since the 18th CPC National Congress, China has placed population issues at the forefront of its governance, and we have achieved precise poverty eradication, accomplished the historic task of building a moderately prosperous country in all respects, and the quality of life of the people has continued to improve. It is an extremely extraordinary thing that such a country with a huge population of more than 1.4 billion people has completed in just a few decades the industrial journey that developed countries have travelled for hundreds of years. The historical and practical experience of China's revolution, construction and reform over the past century has taught us that it is imperative to implement Party leadership in all aspects of national governance and development, to insist on the spirit of struggle, and to insist on analysing and solving practical problems in the light of the country's national conditions.

### 2.2 Chinese-style modernisation is a modernisation for the common prosperity of all people.

One of the essential requirements of Chinese-style modernisation is the realisation of common prosperity for all people. Chairman Mao

pointed out during the period of socialist revolution and construction that the common wealth is not the wealth of some people or the wealth of all the people, but rather that it should be sequential, with the first to get rich bringing up the rear, so as to ultimately realise the common wealth. Comrade Xiaoping pointed out in the new period of reform, opening up and socialist modernisation that common prosperity is one of the greatest advantages of socialism, and that in order to realise common prosperity for all the people, we must adhere to the principle of "emancipation of the productive forces and development of the productive forces".The report of the Twentieth Party Congress states that we must uphold social justice, prevent polarisation, and always make the people's pursuit of and aspiration for a better life our top priority. On the road to achieving common prosperity, everyone must actively strive to maximise and safeguard the tangible interests of the people.

### 2.3 Chinese-style modernisation is a modernisation that harmonises material and spiritual civilisation.

If our country is to achieve the great rejuvenation of the Chinese nation in the process of socialist modernisation, we must insist on the parallel and synergistic development of material civilisation and spiritual civilisation. On the journey of Chinese-style modernisation and development, we still continue to face new challenges. For example, the ability of scientific and technological innovation still needs to be improved, high-quality development is still constrained, and economic structure contradictions are prominent. Chinese-style modernisation has taken corresponding measures around these problems from political, economic and cultural perspectives. Firstly, economically, it has increased the investment in scientific research funds, continuously improved the level of scientific and technological innovation, and enhanced the speed of economic development. Secondly, politically, insist on always letting the people be the master of their own house, so that the people can practically feel the standardisation and proceduralisation of the system of the people being the master of their own house; in terms of the development of Chinese culture, it is necessary to vigorously strengthen the propaganda of the excellent traditional Chinese culture, to create a socialist modernisation spiritual civilisation construction of love for the Party and love for the country throughout the whole Party and to continuously enrich the spiritual world of the people.

### 2.4 Chinese-style modernisation is a modernisation of harmonious coexistence between human beings and nature.

Drawing deeply on the bitter lessons learned from the destruction of the ecological environment in Western capitalist countries, China has paid great attention to the protection of the ecological environment during the process of modernisation, and has vigorously promoted the harmonious coexistence of human beings and nature. Since the beginning of the new century, there have been outbreaks of new infectious diseases such as the Ebola virus and the H1N1 influenza A virus, which have led to global economic crises, and the frequent occurrence of such events has triggered people's deep criticism of and reflection on the capitalist development model. Chinese modernisation has always placed the construction of ecological civilisation at the forefront of its overall work, and has incorporated the "five-in-one" into its overall layout. In the new development concept, Chinese modernisation adheres to the principle of starting from the actual situation, and adheres to the principle of turning the "green mountains and green waters" into the "silver mountains and gold mountains". In the new development concept, Chinese modernisation adheres to the practical approach, insists on turning "green mountains" into "golden mountains", realises the harmonious coexistence of man and nature, and builds a beautiful new China together.

### 2.5 Chinese-style modernisation is modernisation on the path of peaceful development.

Unlike some Western countries that have achieved modernisation through exploitation and plundering, China's unique feature in achieving modernisation is to follow the path of peaceful development. Since the founding of New China, we are the only country that has not invaded its other countries, and we have put forward the important concept of building a community of human destiny; China has been objective and fair, insisting on dialogue, consultation and coordination, and actively resolving hotspot issues in Iran, North Korea and other countries. It has insisted on unity and cooperation in the development of security governance across the region, combating epidemics, opposing extremist terrorism, cybersecurity and other issues. China will strengthen its efforts to promote the construction of the Belt and Road Initiative, provide favourable conditions for all countries, promote mutual benefits and win-win situations among countries, and enable people of all countries to share the fruits of development. China would continue to play its role as a responsible major country and to promote the

building of a community of human destiny.

## 3. The Value Implications of Chinese-style Modernisation Paths

This well-trodden path, which China has explored through practice, has provided the material basis for the rejuvenation of the Chinese nation and a peaceful and win-win road to independent development for the modernisation and development of other countries in the world.

### 3.1 Chinese-style modernisation has further promoted the historical process of the great rejuvenation of the Chinese nation.

The path of Chinese-style modernisation is the correct path explored by the Chinese people at the cost of bloodshed and sacrifice and by summing up the experience of the revolution. Since the reform and opening up, the CPC has led the Chinese people to create miracles in terms of both social stability and rapid economic development, and the rejuvenation of the Chinese nation has entered a new historical stage. Since the 18th CPC National Congress, the CPC Central Committee, with Comrade President Xi at its core, has put forward the "five-in-one" overall layout and coordinated the promotion of the "four-comprehensive" strategic layout, and tackled and solved major issues that had not been solved or accomplished before, resulting in historic changes in the cause of the CPC and the country. The cause of the Party and the country has undergone a historic transformation. We have achieved precise poverty eradication on schedule, completely eliminating the difficult problem of absolute poverty and providing a strong spiritual impetus for the great cause of national rejuvenation. At present, we have built the world's largest education, medical care and social security systems, solving the livelihood issues of greatest concern and difficulty to the people, so that the people's sense of well-being and acquisition has been greatly enhanced, and more obvious and substantial progress has been made towards common prosperity.

### 3.2 Chinese-style modernisation has created a new form of human civilisation.

Western civilisation is based on the destruction of the ecological environment, arbitrary aggression and oppression. In the course of China's modernisation, however, the CPC has fully faced up to, critiqued and absorbed the advantages of modern Western civilisation, and innovatively put forward a "new form of human civilisation" based on its own national conditions. It insists on taking the road of peaceful development to seek the happiness of the people. On the political front, it proposes to build a "community of human destiny"; on the economic front, it insists on promoting the joint construction of the "One Belt, One Road"; on the cultural front, it vigorously carries forward the excellent traditional Chinese culture; and on the ecological front, it promotes the harmonious coexistence of human beings and nature. By giving full play to the systemic advantages of socialism with Chinese characteristics, the path of Chinese-style modernisation has created and generated a positive new form of human civilisation.

### 3.3 Chinese-style modernisation opens up new horizons in Marxist modernisation theory.

Marx pointed out that true philosophy is the essence of the spirit of the times, arises out of the needs of the times, and develops with the times. Chinese-style modernisation was also generated at a specific historical period. In the course of China's social and historical development, the Chinese Communists have carried out a great deal of study, absorption and creative transformation of Marxist modernisation ideas, and have made profound exploration and development of socialist modernisation theories. During the period of the New Democratic Revolution, the Chinese Communists made self-innovation by applying Marxist theory and founded Chairman Mao Thought. During the socialist revolution, Chairman Mao put forward the concept of coordinated development of agriculture and industry, which greatly enriched the theory of socialist modernisation. During the period of reform and opening up,Comrade Xiaoping clarified the concept of "Chinese-style modernisation", which is to build a moderately prosperous society in all aspects and to modernise industry, agriculture, national defence, science and technology. Since the 18th National Congress of the Party, China has entered a new era of socialism with Chinese characteristics, and has always insisted on combining Marxist theory with China's national conditions and the excellent traditional culture of the Chinese nation to answer new questions and challenges raised by the times and practices. In his report to the 20th Party Congress, General Secretary President Xi systematically and comprehensively elaborated the rich connotations of Chinese-style modernisation, providing institutional

safeguards and directional guidance for the development of the Party and the people's cause in the new era, and opening up a new realm of Marxist modernisation theory.

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## Fund project:

This paper is the stage research results of the general project of the National Social Science Foundation of China "Using red cultural resources to promote the study of cultural embellishment" (Project No. 21BDJ103).

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# Analysis on the use of financial engineering to manage enterprise risk

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***Abstract:*** This paper deeply explores the use of financial engineering to manage enterprise risk related content. Firstly, the connotation of financial engineering and risk management is expounded comprehensively. Then it elaborates the effectiveness of financial engineering in the control process of price risk, quantity risk, investment risk, merger risk and agency risk. Then it analyzes the challenges faced by the application of financial engineering to manage enterprise risk. Based on the analysis of this paper, the purpose is to provide more references for enterprises to use financial engineering more effectively in risk management.

***Keywords:*** Financial Engineering; Risk Management; Enterprise Risk

## Introduction

In today's complex and changing economic environment, enterprises are faced with a variety of risks. As an innovative means of risk management, financial engineering has been paid more and more attention by enterprises. It uses methods such as mathematics, statistics and computer science to design, develop and combine financial instruments to help businesses manage risk more effectively. However, the application of financial engineering in enterprise risk management is not smooth sailing, and there are some problems and challenges. Therefore, it is of great practical significance to study the application of financial engineering to manage enterprise risk.

## 1. Financial engineering and risk management

Enterprise risks come from a wide range of sources, on the one hand, risks caused by the uncertainty of the external business environment, on the other hand, risks caused by incomplete internal systems or limited ability of management personnel. In order to effectively avoid the negative impact of risk on enterprise operation and development, risk management has been paid attention to. The so-called risk management focuses on scientific sharing and control.

Before the emergence of financial engineering, the risk management methods commonly used by enterprises include asset liability management, insurance and portfolio investment. These three methods are all on-balance sheet control valves, which offset the risks caused by market finance by adjusting the composition of assets and liabilities in the company's underlying business. Based on its application principle, all three methods have their shortcomings. Based on this, with the change of the development trend of economic situation, in order to better solve the adverse effects brought by risk management, financial engineering, a new method to make up for the shortcomings of traditional risk management methods, has been further explored [1].

Compared with the traditional tripartite risk management method, financial engineering belongs to the off-balance sheet control method, that is, to achieve the goal of avoiding risks with the help of various hedging tools in the financial market. The core of this approach lies in the scientific application of risk management tools and techniques. The so-called financial engineering management method does not involve the items on the balance sheet, nor will it change the balance of the underlying business assets and liabilities. Therefore, its opportunities will not be reflected in the balance sheet, but the market risks scattered in all corners of the social economy can be centrally matched with the trading market, and then divided and packaged and redistributed. Help hedgers avoid most of the risk. Compared with the traditional means, the financial management method has four advantages: high accuracy, strong timeliness, high flexibility and low cost.

## 2. Application of financial engineering in enterprise risk management

### 2.1 Control of price risk

Financial engineering Through the use of futures, options and other derivatives, enterprises can hedge raw material price fluctuations,

lock costs, and protect profits. For example, a manufacturing enterprise expects the price of raw materials to rise in the future, it can buy the corresponding futures contract, so that when the price rises, the profit of the futures contract can make up for the increase in the cost of the spot market, and effectively control the price risk.

### 2.2 Innovation quantity risk control

Financial engineering uses innovative methods to control quantitative risk. For example, the innovation of insurance products is used to guarantee the production quantity of enterprises. When enterprises face the risk of production decline due to natural disasters, technical failures, etc., customized insurance programs can provide certain economic compensation to reduce losses. At the same time, the quantitative model is used to accurately forecast the market demand to help enterprises rationally arrange the production scale and avoid overstocking or insufficient supply.

### 2.3 Diversify and control investment risks

Financial engineering provides companies with diversified portfolio strategies to diversify and control investment risk. Through the asset allocation model, funds are allocated to different asset classes, such as stocks, bonds, real estate, etc., reducing the impact of single asset fluctuations on the overall portfolio. In addition, the use of risk hedging tools, such as the combination of stock index futures and stock spot, when the market fluctuations, to realize the mutual offset of risks, to ensure the stability and return of investment.

### 2.4 Defense and control of merger risks

In the process of enterprise merger, financial engineering can help to prevent and control risks. Through the target enterprise value assessment and risk analysis, to formulate a reasonable merger strategy. We will use M&A loans, leveraged buyouts and other financial means to optimize the capital structure and reduce financing costs. At the same time, derivatives are used to hedge the integration risk after the merger to ensure the stable development of the enterprise after the merger.

### 2.5 Supervise and control agency risks

Financial engineering plays an important role in supervising and controlling agency risk. Through the design of incentive mechanisms, such as stock options, performance rewards, etc., agents' interests are linked to the long-term development of enterprises, so as to reduce agents' behavior of damaging enterprises in pursuit of short-term interests. The risk monitoring model is used to monitor agents' decisions and behaviors in real time, discover potential risks in time, and take corresponding measures to prevent them [2].

## 3. Challenges of using financial engineering to manage enterprise risk

### 3.1 Failure to fully consider systemic risks

When financial engineering is used to manage enterprise risk, there is a challenge that systemic risk cannot be fully considered. Systemic risk is usually caused by macroeconomic, political and other factors, and its impact is wide and difficult to predict. Financial engineering models are often based on historical data and assumptions, and cannot adequately cover such large and complex systemic shocks. For example, a global financial crisis or major policy adjustment may lead to the overall collapse of the market, at which time the risk management strategy of financial engineering may not be able to effectively deal with, resulting in huge losses for enterprises.

### 3.2 Excessive reliance on historical data information

Excessive reliance on historical data information is a significant problem in financial engineering when managing enterprise risks. Although historical data can provide a certain reference, the market environment and economic situation are constantly changing, and past patterns and laws may not be able to accurately predict the future. If the risk model and strategy are constructed solely on the basis of historical data, emerging risk factors and changes in market structure may be ignored, leading to deviations in risk assessment and management, and making enterprises unprepared when facing new risks [3].

### 3.3 Low Probability events cause results to become invalid

When financial engineering manages enterprise risk, the occurrence of small probability events may cause the result to be invalid. Although financial engineering models are often based on probability and statistics, extreme, low-probability events, such as loan defaults or financial crises, have huge impacts that are difficult to predict with conventional models. When these small probability events occur, the risk management strategy originally designed based on normal market conditions may completely fail, bring serious unexpected consequences to the enterprise, and even threaten the survival and development of the enterprise.

## Conclusion

In summary, through the analysis of the application of financial engineering to manage enterprise risk, the important role of financial engineering in enterprise risk management is recognized, and financial engineering provides enterprises with diversified risk management tools and strategies. But at the same time, when using financial risk to manage enterprise risk, this method also has some limitations, mainly in the failure to fully consider systemic risk, too much reliance on historical data and small probability events will lead to problems. Therefore, according to the actual situation of enterprises, reasonable use of financial engineering and continuous improvement of risk management system are the key to ensure the steady development of enterprises in the market environment full of risks.

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# Practical Applications of Level Proximal Subdifferentials in Variational Analysis and Control Theory

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***Abstract:*** This paper explores the practical applications of level proximal subdifferentials in variational analysis and control theory, focusing on their role in handling nonsmooth optimization challenges and enhancing system stability. By examining their use in optimizing complex systems and ensuring robust control under uncertainty, the study demonstrates how level proximal subdifferentials improve adaptability and accuracy in real-world scenarios. Key applications include stability analysis in dynamic systems, adaptive control, and constraint handling. The paper also discusses computational challenges and proposes future research directions to broaden their applicability in high-stakes fields.

***Keywords:*** Level Proximal Subdifferentials; Variational Analysis; Control Theory

## 1. Introduction

The concept of level proximal subdifferentials is a critical tool in modern variational analysis, offering refined approaches to handle nonsmooth optimization problems. In recent years, their application has extended to control theory, where stability and optimization in complex systems demand advanced mathematical techniques. The level proximal subdifferential framework provides an effective way to manage irregularity and discontinuity, particularly in optimization landscapes where traditional derivatives are insufficient. This paper focuses on the practical applications of level proximal subdifferentials, addressing their role in enhancing solution accuracy, stability, and efficiency in variational analysis and control. By examining their utility in real-world control systems, such as adaptive optimization and robust control, this study underscores how these subdifferentials address key challenges in stability analysis and constraint management. Through targeted applications, the paper aims to illuminate the transformative impact of level proximal subdifferentials in advancing both variational analysis and control theory, bridging theoretical innovation with practical efficacy.

## 2. Fundamental Concepts and Methodology

### 2.1 Core Concepts of Level Proximal Subdifferentials

Level proximal subdifferentials are crucial in addressing nonsmooth and irregular functions common in variational analysis and control application[1]. Unlike classical derivatives, which apply only to smooth functions, proximal subdifferentials extend derivative-like properties to functions with abrupt changes or discontinuities, which is invaluable in complex, non-differentiable optimization landscapes. By constructing a “level” around a point, these subdifferentials define a boundary where subdifferential calculus can operate effectively, allowing minor variances to be managed without the sensitivity issues typical of traditional methods. This flexibility makes them essential in variational applications like stability optimization and resource allocation, where solutions must satisfy strict feasibility. This section introduces these core concepts, laying the groundwork for the practical applications discussed in this paper.

### 2.2 Methodological Framework and Analytical Techniques

This study utilizes a methodological framework that applies level proximal subdifferentials to optimize and stabilize control processes in complex systems. Key techniques include variational methods to evaluate and adjust solution behavior within defined boundaries, allowing precise tuning for enhanced stability and resilience against small disturbances. In control theory, where system dynamics are sensitive to fluctuations, level proximal subdifferentials support robust adaptive control by isolating nonsmooth elements[2]. This approach involves iterative recalculations of subdifferentials to maintain stability as system conditions change. Sensitivity analysis within this framework ensures optimal solutions across scenarios, highlighting the practical benefits of integrating level proximal subdifferentials into variational analysis and

control theory for complex real-world problems.

# 3. Application in Variational Analysis

## 3.1 Enhancing Optimization in Complex Systems

One of the most significant applications of level proximal subdifferentials in variational analysis lies in optimizing complex systems with nonsmooth or discontinuous structures. Traditional gradient-based methods struggle to navigate these irregular landscapes effectively, often yielding suboptimal solutions. However, level proximal subdifferentials offer a means to approximate and manage these discontinuities by providing a structured boundary within which local optimality can be achieved. For instance, in large-scale systems requiring multi-objective optimization—such as network resource allocation or energy distribution—level proximal subdifferentials allow for more precise control over solution paths by isolating each objective's influence within its local neighborhood. This capability makes it possible to fine-tune solutions based on real-time data inputs, enhancing system resilience and adaptability. Furthermore, the ability to maintain stability in the presence of sudden variations allows for robust performance across different scenarios, which is critical in dynamic environments like logistics and supply chain optimization.

## 3.2 Advancing Regularization and Constraint Handling

In variational analysis, regularization plays a crucial role in managing the stability and generalizability of solutions, particularly when dealing with ill-posed or underdetermined problems. Level proximal subdifferentials provide a practical method to apply regularization in these challenging contexts, as they are inherently equipped to handle nonsmooth constraints that conventional methods cannot. By defining proximal levels around potential solutions, this approach limits excessive solution variance, yielding more stable outcomes that resist overfitting and improve robustness. This has direct implications in applications like image reconstruction, where sharp edges and noise are common obstacles, or in data science, where irregularities in datasets can significantly affect solution accuracy. Additionally, level proximal subdifferentials are beneficial in high-dimensional optimization tasks, as they help navigate complex constraint landscapes without excessive computational cost[3]. Through this targeted constraint handling, level proximal subdifferentials ensure that solutions remain within feasible regions, enhancing the practicality and reliability of variational analysis in real-world scenarios.

# 4. Application in Control Theory

## 4.1 Stability Analysis in Dynamic Control Systems

Level proximal subdifferentials have proven valuable in the stability analysis of dynamic control systems, where maintaining system robustness amid varying conditions is essential. In control theory, stability often hinges on a system's response to disturbances, requiring precise tools to predict and control these responses. By applying level proximal subdifferentials, control engineers can define stability margins that account for nonsmooth behavior, especially in systems with abrupt transitions or nonlinearities. For instance, in robotic motion control or autonomous vehicle navigation, level proximal subdifferentials help manage unpredictable environmental factors, such as obstacles or variable terrain. These applications benefit from the method's ability to encapsulate regions of stability around a target trajectory, allowing systems to remain within safe operational boundaries despite external disturbances. Additionally, the use of level proximal subdifferentials allows for the gradual adjustment of control inputs, improving response accuracy and reducing the likelihood of abrupt system shifts[4]. This stability-focused approach underscores the practicality of level proximal subdifferentials in real-world dynamic control scenarios.

## 4.2 Adaptive and Robust Control under Uncertainty

Adaptive control, particularly in environments characterized by uncertainty and rapid changes, also benefits from the integration of level proximal subdifferentials. In adaptive control frameworks, it is critical to adjust control parameters in real time to accommodate fluctuations in system behavior or external conditions. Level proximal subdifferentials allow for precise adjustments within proximal boundaries, enabling robust control even under conditions of uncertainty[5]. This is especially relevant in fields like aerospace and energy systems, where

operational parameters often shift unpredictably due to factors such as weather or fluctuating demand. The methodology aids in maintaining system efficiency by providing a stable reference level that guides adjustments without destabilizing the overall control process. Furthermore, in sensitivity analysis—a key component of robust control—level proximal subdifferentials help quantify the impact of minor perturbations on system performance. By evaluating the system's responsiveness within proximal boundaries, engineers can fine-tune control settings to optimize performance under varying operational constraints. These adaptive and robust applications demonstrate the versatility and efficacy of level proximal subdifferentials in advancing control theory practices.

## 5. Practical Challenges and Limitations

Despite their advantages, the practical application of level proximal subdifferentials in variational analysis and control theory faces notable challenges. A primary limitation lies in the computational intensity required to calculate and implement subdifferentials in large-scale or highly dynamic systems, where iterative recalculations may slow down real-time processes. Additionally, the mathematical complexity of level proximal subdifferentials can pose barriers to integration, particularly in fields where expertise in advanced calculus and nonsmooth analysis is limited. Another challenge is the sensitivity to parameter selection within the proximal framework, as minor variations can significantly impact stability and optimization results. Addressing these challenges will require continued research into efficient computational algorithms and parameter-setting guidelines, enabling broader adoption of level proximal subdifferentials in practical, high-stakes applications.

## 6. Conclusion and Future Directions

In conclusion, level proximal subdifferentials provide powerful tools for addressing complex optimization and stability challenges in variational analysis and control theory. Their applications enhance robustness and adaptability across diverse, real-world systems. However, practical challenges, such as computational demands and parameter sensitivity, highlight areas for future research. Advancing algorithmic efficiency and developing accessible frameworks for parameter selection will be essential to broaden their applicability. Future work could also explore novel integrations with machine learning models, enabling automated adjustments in control systems and expanding the practical impact of level proximal subdifferentials in emerging fields.

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# Accounting information system audit and its risk analysis

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***Abstract:*** This paper firstly summarizes the accounting information system and audit, and then discusses the types and causes of audit risks, including the risks of the system itself, auditors, internal control, etc., and analyzes the reasons from the perspectives of technology, personnel quality, physical security and data protection. Finally, four effective strategies to avoid risks, namely strengthening internal control, attaching importance to external audit, building security guarantee mechanism and improving the quality of auditors, are put forward to provide reference for reducing the audit risk of accounting information system.

***Keywords:*** Accounting Information System; Audit; Risk; Evasive Strategy

## Introduction

In today's digital age, accounting information system plays a key role in the financial management of enterprises. However, its complexity and informationization characteristics also bring a series of audit risks. In order to ensure the accuracy, reliability and compliance of accounting information, it is very important to conduct an effective audit of accounting information system.

## 1. Overview of accounting information system audit

### 1.1 Accounting information system

Accounting information system is a system that uses information technology to collect, store, process and report accounting data. It covers four modules: business processing function, internal control processing function, accounting processing function and audit trail collection function, which can realize automatic processing and information sharing of accounting business. By integrating an enterprise's financial and business processes, accounting information systems provide timely and accurate financial information for enterprise decision-making.

### 1.2 Accounting information system audit

Accounting information system audit is the process of examining and evaluating the security, reliability and effectiveness of accounting information system. Not only the financial data in the system, but also the hardware, software, network, internal control and other aspects of the system. The purpose of the audit is to ensure that the system can accurately record and process financial transactions, protect business assets, and comply with relevant regulations and policies.

## 2. Audit risk and reason analysis of accounting information system

### 2.1 Overview of audit risks

*2.1.1 Accounting information system's own risk*

In today's digital age, the complexity of accounting information system is increasing day by day, and there may be potential problems in the stability of software, storage and processing of data. The system may experience virus attacks, hacking, or data loss and system crash due to hardware failure. Moreover, with the development and change of business, if the update and upgrade of the system is not timely and imperfect, it will also cause a series of risks [1].

*2.1.2 Risks brought by auditors*

The auditor's professional ability, experience level and familiarity with the accounting information system will affect the audit quality. If auditors lack sufficient information technology knowledge and can not accurately understand and evaluate the operating logic and data processing process of the system, it may lead to audit errors and fail to find hidden problems in the system.

*2.1.3 Risks caused by internal control defects*

The imperfect internal control system, such as the unclear division of responsibilities, the less strict approval process, the lack of supervision mechanism, etc., may make the accounting information system in the operation of the error or fraud and not be found and corrected in time.

### 2.2 Risk cause analysis

*2.2.1 Insufficient auditing techniques and evidence acquisition methods of accounting information system*

The current audit technology may not be able to fully adapt to the complex and changeable environment of the accounting information system. For some new system architecture and data processing methods, the traditional audit methods may seem inadequate. Moreover, the means of obtaining effective audit evidence are relatively limited, and it is difficult to fully and accurately reflect the real situation of the system.

*2.2.2 The comprehensive quality of accounting information system auditors is not up to standard*

Auditors not only need to have solid accounting and audit expertise, but also need to be proficient in information technology and related regulations and policies. However, in reality, many auditors have the defects of knowledge structure in these aspects, and can not cope with various challenges in the audit of accounting information system.

*2.2.3 There are loopholes in the physical security management of accounting information system*

If the storage environment of the server and the protective measures of network equipment and other physical security management are not in place, they are prone to natural disasters, man-made damage and other factors, which threaten the normal operation of the accounting information system and data security.

## 3. Effective strategies to avoid audit risks of accounting information system

### 3.1 Strengthen the internal control of accounting information system

Establishing sound internal control system is the basis of reducing audit risk. First of all, the system operation process is clear to avoid the blindness and confusion of the operator. At the same time, attention should be paid to rights management to ensure that personnel at different levels are given the rights that match their responsibilities to prevent confusion and risks caused by unauthorized operations. And for critical control points, monitoring efforts should be strengthened, such as real-time tracking and recording of major capital flows and approval of important financial decisions. Regular internal audit and risk assessment are also feasible measures. Through a comprehensive review of the system operating status, potential risks can be discovered in time and corresponding countermeasures can be formulated to avoid the adverse consequences of risks. To sum up, human errors and illegal operations can be minimized through perfect internal control, providing a solid guarantee for the safe and stable operation of the accounting information system [2].

### 3.2 Attach importance to the external audit work

External audit can provide independent and objective evaluation and supervision. As another “subsystem” of audit supervision, external audit can effectively integrate and coordinate with internal audit to form a “two-pronged” mode, which is the key to ensure the healthy development of enterprises. In the selection of audit institutions, should be selected with professional qualifications and rich experience of the unit. Only in this way can we really play the role of external audit and realize the comprehensive audit of accounting information system.

### 3.3 Build and improve mechanisms to strengthen security

Building a comprehensive security guarantee mechanism, including network security, data security and access control, is a key task. In terms of network security, advanced firewall technology is adopted to monitor and block external malicious attacks and illegal intrusions in real time. For data security, the scientific use of efficient encryption technology to encrypt important data, and through strict identity authentication screening visitors, based on identity authentication, only legitimate authentication users can access the system, can effectively prevent

unauthorized personnel from obtaining sensitive information. At the same time, the establishment of a sound emergency response mechanism, when the system encounters a failure or a security incident, the rapid launch of the emergency plan and timely measures to deal with it are the key to ensure the minimum loss and impact [3].

### 3.4 Improve the quality of auditors through training

Regular organization of auditors to participate in training is an effective way to improve their comprehensive ability. Training content should cover accounting, auditing, information technology and other fields of knowledge and skills. In accounting, in-depth study of the latest accounting standards and financial regulations to ensure compliance and accuracy of audit work. In addition, auditors should be encouraged to continue to learn and update knowledge, pay attention to industry trends and cutting-edge technologies, and constantly improve their professional quality. By mastering the latest audit methods and technologies and enhancing professional judgment and risk awareness, they can be able to find problems, assess risks accurately and propose practical solutions in the complex and changeable audit work.

## Conclusion

To sum up, the effective management of audit risk of accounting information system is of great significance for ensuring the quality and safety of enterprise financial information. By analyzing the specific performance and causes of risks, this paper puts forward four practical avoidance strategies, hoping that this study can provide more references for improving audit quality and efficiency.

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# A Brief Analysis of the Design Research of Forbidden City Architectural Elements in Scarf Patterns

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***Abstract:*** As a representative of Chinese culture, the architecture of the Forbidden City is a significant aspect of traditional ancient Chinese architecture.The patterns and shapes found on its buildings possess rich artistic connotations and considerable research value. This paper analyzes the cultural significance and architectural features of the elements within the Forbidden City. It extracts characteristic architectural elements from the Forbidden City and seeks to integrate these elements with modern clothing design. Furthermore, it explores the adaptability of traditional Forbidden City architectural elements when used in silk scarves as a medium. The aim is to promote the dissemination and development of traditional culture while providing innovative design concepts for contemporary fashion.

***Keywords:*** Forbidden City; Silk Scarves; Cultural and Creative Design; Architectural Elements

## Introduction

Emphasizing cultural self-confidence and bolstering cultural soft power, traditional culture is garnering wider societal attention. China boasts diverse and vibrant architectural styles. Beijing's Forbidden City, with its iconic hipped roofs, stands as a majestic symbol of ancient royalty, not only a pinnacle of Chinese architecture but also the world's largest ancient building complex, exemplifying the height of ancient Chinese architectural art. Globally, architecture effectively showcases national cultural charm, embodying artistic and cultural values that transcend other arts, rich in traditional elements and regional identity. Urgently, this rich heritage demands inheritance, protection, and promotion.

## 1. Research background

### 1.1 Cultural Connotation of the Forbidden City Architectural Elements

Currently, people are emphasizing the significance of cultural heritage and its development, which is intricately intertwined with economic activities, driving social advancement. To uphold Chinese culture amidst global cultures, modernizing and advancing our culture is paramount. The Forbidden City, a stunning Ming Dynasty complex, showcases China's cultural riches and the nation's rich history.

### 1.2 Cultural connotation of silk scarf products

As a versatile clothing accessory embodying function, decor, aesthetics, emotion, taste, and fashion leadership, accurately predicting silk scarf trends and capturing popular styles, elements, and patterns are vital to its design[1].By delving into Forbidden City's architectural elements and their integration into silk scarf designs, we can discover unique decorative techniques, breathe new life into these scarves through theory-practice fusion, illuminate ancient Forbidden City elements in modern attire, and foster a living heritage of traditional culture with innovative applications.

## 2. Research status

### 2.1 Status of Application of Architectural Elements of the Forbidden City

The Forbidden City's cultural products captivate the public, yet few are directly integrated into clothing design, especially apparel accessories. Wei Yumeng leveraged Forbidden City colors and digital tech to preserve traditional patterns and innovate national fashion designs[2]. Han Yue et al. analyzed the connection between Forbidden City architecture and clothing design, deepening understanding of its elements and revealing their impact on modern fashion design[3].

### 2.2 Status of research on silk scarves

Silk scarves, a unique apparel accessory, are emerging in the industry but lack dedicated academic literature. As personalization and fashion trend, silk scarves, reflecting individual style, are in high demand. Leading brands and design events invest in scarf innovation, offering unique designs and craftsmanship to cater to diverse consumer preferences.

## 3. Overview of silk scarves

Silk scarves, fashion accessories, offer aesthetics & functions like wind, sun, & dust protection. Worn draped, tied, or as collars, they're elegant textile choices. Traditional ones are intricate, involving silk extraction. Modern silk scarves showcase material diversity, mainly imitation silk & silk, in various shapes & sizes like long, square, & triangular, catering to diverse occasions & styles.

## 4. Application of Architectural Elements from the Forbidden City in Silk Scarf Design

Forbidden City's architecture showcases traditional design, offering artistic inspiration and value. Its structure mirrors the organization and relationships of conformational elements, forming a comprehensive formal element[4]. This structural pattern governs style and appearance, reflecting unity and prescriptiveness.

### 4.1 Pattern Analysis

Most of the architectural structures in the Forbidden City are skillfully constructed from wood. To resist erosion and aging, craftsmen meticulously apply colored lacquer to these wooden structures. These colored lacquers are not only colorful, but also painted into far-reaching patterns and motifs. This enhances the visual aesthetics of the building while providing rich cultural significance and decorative appeal. The decorative patterns on these buildings have become a significant source of inspiration for this design scheme. The integration of the unique shapes of hipped buildings enhances the recognizability of the pattern design, aiming to showcase the extraordinary charm of ancient Chinese architecture within the context of inheritance and innovation.

### 4.2 Compositional Analysis

The architecture of the Forbidden City shows a strong sense of stability and structural aesthetics, characterized by its exquisite symmetrical layout and counter-rotating angular design. This design not only provides the building with a broad range of applicability and architectural inclusiveness but also serves as a source of inspiration for decorating marginal areas that may lack visual stability. By incorporating the unique charm of the Forbidden City's architectural elements, these areas can enhance and adjust people's visual and psychological perceptions.In the realm of silk scarf design, compositional structure also plays a crucial role. This design solution skillfully adopts a compositional structure similar to the architecture of the Forbidden City, aiming to make the picture of the silk scarf present a more harmonious and comfortable visual effect. As consumers appreciate the scarf, they can experience a sense of stability and elegance derived from the ancient architecture.

### 4.3 Color Analysis

The buildings of the Forbidden City utilize color in a manner deeply rooted in the ancient principles of yin and yang, as well as the five elements. Gold and red serve as symbols of imperial power, emphasizing the emperor's supreme dignity. The main structure of the complex features a roof adorned with yellow glaze, complemented by vermilion walls. This striking combination of gold and red not only creates a vivid contrast but also imparts an extraordinary sense of opulence and grandeur to the entire complex. Furthermore, the interplay of colors is evident in the blue of the sky and the yellow of the glazed tiles, the red and green of the doors and windows, and the painted decorations. The contrasting shades of the white pedestal and the ground further illustrate the intricate art of color coordination. The thoughtful contrast and blending of these colors provide viewers with a stunning visual experience, conveying a powerful emotional expression and reflecting the unique cultural significance and aesthetic philosophies inherent in the colors of traditional Chinese architecture.

## 4.4 Design Practices

The design of this silk scarf skillfully integrates the essence of the Forbidden City's architecture. Its outer frame is inspired by the flying eaves and ancient doorposts of the Forbidden City, aiming to inherit the culture while exploring the harmonious symbiosis between tradition and modernity. The design adheres to the principle of maintaining the unique character of the Forbidden City while incorporating modern aesthetics, and is skillfully laid out: : the doorposts are elegantly positioned on either side of the pattern, while the eaves gracefully arch over the top in a streamlined manner, with intricate arch details cleverly interspersed to add depth and richness. At the bottom of the design, flooring elements are spread out, and the overall composition combines square and round shapes, creating a dynamic, flowing, and introspective visual experience that is both full and soft. This design not only guides the viewer's gaze to naturally focus on the central subject but also demonstrates balance and harmony through its clever symmetrical arrangement.

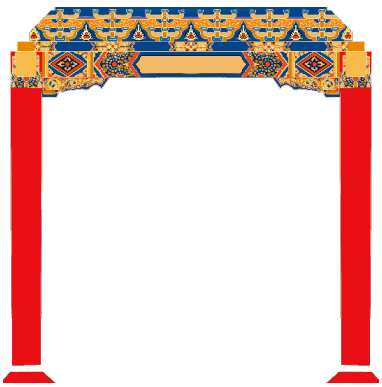

Figure 4-1 Draft Schematic Design

*4.4.1 main pattern*

The hipped architecture of the Forbidden City is distinctive, and the essence of this design is deeply reflected in its characteristics. The pattern draws inspiration from the magnificent appearance of the Palace's iconic 'Hall of Supreme Harmony.' After careful refinement and re-creation, it not only presents the Palace from multiple perspectives—ranging from distant views to close-ups—but also progresses step by step. The design cleverly employs the technique of 'borrowing shape from shape' to create an immersive experience. This approach not only imparts a strong sense of identity to the artwork but also enhances its visual appeal. Furthermore, the design embodies a rich visual aesthetic rooted in Chinese style while profoundly inheriting the traditional auspicious culture of the Chinese nation. As a result, viewers can appreciate the deep cultural heritage and positive meanings embedded in the work while enjoying its beauty.

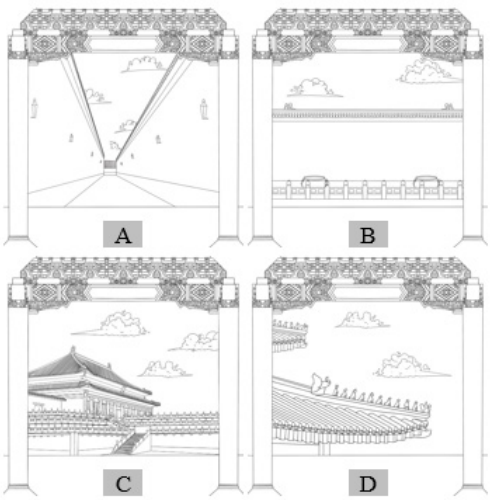


Figure 4-2 Draft main pattern design

Figure 4-3 Finished Product

## 5. Summary

Analyzing Forbidden City elements in modern design, emphasizing silk scarves' market value, exploring their fusion with Forbidden City architecture, revitalizing traditional motifs, blending modern ideas & trends, harmonizes tradition & modern fashion, offering fresh ideas & practical cases for traditional pattern innovation in modern dress design.

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# Discussion on The Usage of Punctuation Marks

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***Abstract:*** The Usage of Punctuation Marks (GB/T15834-2011) has been adopted as a national standard for many years; however, certain areas may benefit from further improvement. The main points are as follows: firstly, it is advisable to add an introduction to the dot mark "."; secondly, it would be beneficial to expand the scope of the book title mark; thirdly, establishing a proper noun mark in modern Chinese texts is recommended; and fourthly, the repeated use and combination of question and exclamation marks should take into account the punctuation practices of ancient Chinese literature.

***Keywords:*** Punctuation Usage; Shortcomings; Revision Suggestions

## 1. Introduction to the addition of the Dot Mark "."

The Usage of Punctuation Marks does not specifically include this symbol, though it provides a special note: "Special symbols used in fields such as mathematics, currency, collation, dictionaries, and annotations do not belong to punctuation marks." The dot mark is neither a mathematical symbol nor a specialized symbol in any other field; thus, it should be classified as a punctuation mark.

In terms of usage, the dot primarily functions to denote sequence, intervals (e.g., year, month, and day), and chapter numbers in texts. The standard function is primarily ordering, while the interval function appears between serial numbers, such as 2.1 and 2.1.1.

Regarding intervals in dates, Annex A of the Supplementary Rules for the Use of Punctuation Marks states:

A.4: Supplementary Rules for the Use of the Dot Mark: When using Arabic numerals for abbreviated dates, a short hyphen should connect the numerals instead of the dot mark.Although the short hyphen is suggested, the dot mark remains widely used in date formatting, such as "2010.03.02".

Appendix B, **Description of Punctuation Marks**, further elaborates:

B.3.3: When numbering Arabic, Latin, or Roman numerals without parentheses, the dot mark should follow as a punctuation symbol (originating in a foreign language).

B.3.5: Combining Arabic numerals with dot marks indicates the end of each hierarchical level.

It is worth noting three points regarding Annex B's descriptions:

(1) It may be inaccurate to state that the "dot mark belongs to foreign punctuation" since, although it originated in English, it has been adopted into Chinese as a functional mark and should no longer be regarded solely as foreign. Similar marks, such as "?" and "!" originally from other languages, are now established punctuation in Chinese.

(2) When used to express hierarchical relationships in texts, the dot mark functions not only for ordering but also for separating the levels of hierarchy, as between the first and next levels.

(3) The description of the dot mark is incomplete and does not include its use in date intervals, such as "2023.8.30", which is not common in English date formats.

Therefore, the Usage of Punctuation Symbols should include a detailed introduction to the dot mark, recognizing it as part of Chinese punctuation (originating from foreign usage) and elaborating on its functions within the Chinese language.

## 2. Expanding the Scope of Book Title Usage

The Usage of Punctuation Marks specifies guidelines for book titles:

Basic Usage To mark titles of books, volumes, articles, publications, newspapers, and documents.To mark titles of films, television shows, music, poetry, sculpture, etc.For software names primarily in Chinese or with Chinese dominance.For abbreviations of work titles.

When a title appears within another title, use double quotation marks for the outer title and single for the inner title.

As one of the proprietary names, there was no special title previously. The title number is likely related to the English title specifically marked in italics. However, the title has far exceeded its intended scope. For example, the following non-title names are used: the sculpture name (“Oriental Dawn”), the TV program name (“Light and Shadow”), and the computer software name (“Computer Guard”). In real life, when mentioning antivirus software like 360 Security Guard, Microsoft Computer Butler, 2345 Security Guard, or Tencent Computer Butler, the title is generally not used. Many writers refer to “thinker” or “broken arm Venus” without the title or quotation marks, such as:

Example 1: The broken arm of Venus is the first century BC work.....(Half-naked artistic charm? Interpretation of the Venus statue, https: / / baijiahao.baidu.com/s?id=1693163084903953922&wfr=spider&for=pc ）

Example 2: The work integrates the profound spiritual connotation with the complete characterization.....(Appreciation of the statue of thinkers (Symbolism of the statue of thinkers), https: / / www.diaolongke.com/news/43812.html）

It is worth considering that since sculptures can have titles, punctuation rules state that titles can “indicate the names of various works that appear in the paragraph.” Does this mean that titles cannot be added to other works, such as architectural ones? Famous structures like “Free Idol,” “Small Waist,” and the “Water Cube” could also have titles.

On the other hand, in practical language usage, the widespread application of titles frequently deviates from punctuation guidelines. This discrepancy arises not solely because punctuation marks inherently encompass titles, but also due to the absence of a dedicated punctuation mark (or specific terminology) for modern Chinese text titles, as explained further below.

This paper advocates for broadening the application of appellations based on practical utility, incorporating names derived from sculptures and television into the appellation category, as well as encompassing titles pertinent to the subjects at hand, including book titles, course names pertaining to cultural achievements, and research project titles—such as Modern Chinese courses and research endeavors like “Comparative Studies of Ancient and Modern China.” Despite repeated efforts to discourage these usages, they remain prevalent in linguistic practice, owing to the fact that individuals view them as proper names lacking distinctive symbols and thus instinctively apply the label of titles associated with books and culture. In the present scenario, the sphere of book title utilization can be expanded in alignment with public usage psychology and practices.

Moreover, the punctuation rule states that modern Chinese texts should not use names and must use labels instead. Using quotation marks is inconsistent with social understanding, as they are viewed as “references,” not name symbols. Titles are perceived as more appropriate for naming, leading to their common misuse.

## 3. Establishing a Marker for Special Names in Modern Chinese Texts

The specifications for using “special names” in the Usage of Punctuation Marks are as follows:

Basic Usage of Special Name:Proper nouns in ancient texts, such as names of people, places, states, nations, dynasties, eras, religious terms, official titles, and organizations.These terms, along with other proper nouns, such as unit names, official titles, events, conferences, and titles, should use alternative markers in modern Chinese texts, like quotation marks or title punctuation.

Clearly, the current guidelines for special names are meant for classical Chinese texts and do not apply to modern Chinese. In instances where such a label is necessary, alternative markers—like quotation marks or title numbers—are recommended. However, in modern Chinese contexts, there are cases where proper names may need special highlighting, yet there is no suitable punctuation available for this purpose. Although quotation marks or title markers could be used, both are somewhat inadequate. Quotation marks are commonly associated with “reference” and are not generally recognized as name markers, while using title markers may contravene title usage standards.

For example, if a cement road donated by community benefactors is named “Health and Longevity Road” by the organizers, there is no ideal symbol to properly emphasize this name in the text:

Example 3a): This health and longevity road was constructed through community donations.

Example 3b): This “Health and Longevity Road” was constructed through community donations.

Example 3c): This Health and Longevity Road was constructed through community donations.

In Example 3a), the phrase does not effectively highlight the road’s name as intended. Example 3b) uses quotation marks, which adhere

to standard punctuation but may not convey the intended emphasis. Example 3c) capitalizes on a title marker, effectively emphasizing the name but does not conform to standard punctuation. In practice, however, the third format is often used, reflecting the lack of a truly appropriate symbol.

To address this gap, we propose establishing a new symbol specifically for special names in modern Chinese texts. Rather than a horizontal line (as it is less recognizable as punctuation in modern contexts), this new marker, potentially named "name mark" or "designation mark," could serve as a standardized option, meeting the need for a distinctive label and avoiding the confusion associated with using other markers.

## 4. The Use of Combined Question and Exclamation Marks in Ancient Chinese Literature

According to Usage of Punctuation Marks, "4.2 Question Mark" specifies:

4.2.3.3: When multiple questions are posed, or when the tone of questioning intensifies, question marks may be stacked, with a maximum of three. In cases lacking extreme emotional emphasis, question marks should not be stacked.

Unlike the use of other individual punctuation marks, the question mark and exclamation mark can overlap and combine. Special attention should be given to punctuation in ancient Chinese literature.

The author believes that stacking question marks and exclamation marks serves to strengthen emphasis and depends heavily on context. In ancient Chinese, determining the meaning can sometimes be challenging. Using a single question or exclamation mark is often sufficient to convey the intended tone. Thus, it is common for ancient Chinese literature to avoid stacked questions or exclamation marks.

However, the combination of a question mark and an exclamation mark is different. This combination is not merely reinforcing; it introduces both questioning and exclamatory tones, which are essential for clear expression. Therefore, the combination of these two marks should be used in ancient Chinese literature, especially in contexts that include questioning or exclamatory words.

Despite this need, the combination of the question mark and exclamation mark remains rare in ancient texts. For example:

In The Analects of Confucius, The Master said.

This passage, quoted by Yang Jianqiao (2010:151)[3], explains that "'hu' indicates doubt, and 'zai' serves to strengthen the rhetorical question." Here, "zai" functions as an exclamation, reinforcing the rhetorical tone; however, the punctuation only includes a question mark, failing to fully capture the exclamatory tone.

Additional examples where exclamation marks might have been appropriate are provided by Yang Jianqiao (2010:146, 153) [3]:

While question and exclamation marks are often used together to clarify modern texts, ancient Chinese literature typically lacks this combination, sometimes resulting in ambiguous expressions. For instance, in Yang Bojun's translation of The Analects of Confucius:

Example 4: "Original: "He shi yu ren!" Translation: "How could it only be the way of benevolence?"" [4] (pp. 90-91).

Although an exclamation mark is used here, both the phrase "he shi" and "how" imply a question. "?!," might more accurately capture the tone.

Example 5: "Original: "Gong Bo Liao qi ruo ming he!" Translation: "What could Gong Bo Liao do about my fate?" [4] (p. 218).

The single exclamation mark omits the interrogative sense of "ruo...he" and "what," making "?!" more appropriate.

Example 6: Original: "Wu shui qi? qi tian hu!" Translation: "Whom would I deceive? Heaven?" [4] (p. 128).

Here, the original text uses an exclamation mark, while the translation includes a question mark. The proper punctuation would be "?!" to convey both emotions fully. Similarly, Wang Li (2014) presents this as a question rather than an exclamation [5] (p. 87), though another instance combines both marks.

Again, the original uses an exclamation mark "!", while the translation opts for a question mark "?". The combination "?!" would more accurately reflect both question and exclamation.

This variance highlights how some sentences end in a question mark while others use an exclamation mark, as seen in:

Example 7: "The gentleman, the original and born. Filial piety younger brother also, the foundation of people and!" [4] (p. 3)

Example 8: "The gentleman, the original and born, filial piety brother also, the foundation of people and?" [6] (p. 242)

The end punctuation in these examples is appropriate; otherwise, each expression would be misaligned.

Notably, Wang Li (2014) seems to support using both question and exclamation marks. In his analysis of the modal term “zai,” he writes:

Wang’s analysis implies that both punctuation marks “?!” are appropriate when both questioning and exclamation are intended. However, he does not apply this consistently in his own work, making it challenging for others to follow.

It seems necessary to clarify that question and exclamation marks can indeed be combined where needed, particularly in sentences that convey both questioning and exclamatory tones. This approach aligns with practical language use and may help resolve ambiguities in punctuation within ancient texts.

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## Acknowledgment

The National Standard of the People’s Republic of China, GB/T15834-2011 Punctuation Mark Usage[1] (hereinafter referred to as “Usage of Punctuation Symbols”), has been in effect for many years. The author believes that, while valuable, this standard has areas that could be improved.

# The application of mathematical modeling in college mathematics teaching

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***Abstract:*** The innovative research and development of technology cannot be separated from the support of mathematical knowledge. Mathematics is a basic subject of science majors in colleges and universities. For college students, mathematics is a relatively difficult subject. The application of mathematical modeling can help students understand abstract mathematical knowledge and promote students to put mathematical knowledge into practice. Based on this, this paper discusses the specific application path of mathematical modeling in college mathematics teaching, in order to improve the quality of college mathematics teaching and enhance the effect of students' mathematics learning.

***Keywords:*** Mathematical Modeling; Colleges and Universities; University Mathematics; Mathematics Teaching

Mathematics knowledge is the basic knowledge of all kinds of research, and its importance is self-evident. However, in the past mathematics teaching in colleges and universities, teachers often attach importance to the teaching of theoretical knowledge and calculation, but ignore the cultivation of students' mathematical thinking and practical application ability, which is not conducive to students' employment. Therefore, teachers in colleges and universities should actively explore teaching methods to train students' mathematical thinking and practical application ability, and enhance students' mathematical learning effect. Mathematical modeling is an effective method to combine mathematical theory with practical problems, that is, to establish mathematical models according to practical problems, to solve mathematical models, and then to solve practical problems according to the results [1]. With the increasing social demand for high-quality and compound talents, it is necessary to reform mathematics teaching in colleges and universities and introduce mathematical modeling to make up for the shortcomings of the traditional emphasis on theory and light practice, and cultivate students' mathematical thinking and problem-solving ability. This paper aims to explore the specific application of mathematical modeling in mathematics teaching in colleges and universities, which has certain practical significance for promoting the reform of mathematics teaching and improving the quality of mathematics talents training.

## 1. The application significance of mathematical modeling in college mathematics teaching

### 1.1 Promote the deep integration of mathematical theory and practice to improve teaching quality

Mathematical modeling is a teaching method that combines mathematical theory with world problems. Applying mathematical modeling can promote the deep integration of mathematical theory and practice. In the past, teachers in college mathematics teaching often paid more attention to the explanation of theoretical knowledge, which was abstract and difficult to understand, and students gradually lost their interest in learning mathematics. In the long run, it was not conducive to students' actual mastery of mathematical knowledge. Mathematical modeling emphasizes the use of mathematical methods to solve practical mathematical problems, and applies mathematical modeling to mathematics teaching. In the process of constructing mathematical models, solving and analyzing, students can effectively experience the role of mathematical theoretical knowledge in solving practical problems, deepen their understanding of knowledge, and stimulate students' thirst for knowledge and interest in learning. Mathematical modeling can cultivate students' practical ability, solve practical problems and improve teaching quality.

### 1.2 Strengthen the cultivation of students' innovative ability and improve their comprehensive quality

Applying mathematical modeling in mathematics teaching in colleges and universities is conducive to cultivating students' innovative ability. Innovation is the internal driving force of social development and national development, and it is of great significance to train college students' innovation ability in line with the requirements of social development and national development. The application of mathematical

modeling can cultivate students' creative thinking and creative ability in the process of mathematics teaching. The process of mathematical modeling requires students to constantly try, explore and verify, so as to find the optimal solution or approximate solution. This process exercises students' logical thinking and reasoning ability, and is conducive to stimulating students' innovation ability. Through mathematical modeling, students can learn how to face complex problems, how to propose new ideas and solutions, and use them to try and practice, so as to improve students' comprehensive quality.

## 2. Application of mathematical modeling in mathematics teaching in colleges and universities

### 2.1 Change the teaching concept and highlight the principal position of students

To apply mathematical modeling to mathematics teaching in colleges and universities, teachers should first change the traditional teaching concept of emphasizing theory and undervaluing practice, require teachers to change their roles from knowledge imparts to guides, encourage students to actively explore and practice, and respect students' main position in the classroom. In the teaching process, teachers should respect the individual differences of students and teach students according to their aptitude. Each student is unique, the math foundation and learning ability are different, teachers should be based on the actual situation of students, through personalized guidance, teachers should design specific questions according to the students' learning situation. In the process of applying mathematical modeling to teaching, teachers should pay attention to students' learning status, timely help students solve the problems encountered in the process of mathematical modeling, enhance students' learning information, and avoid students' difficulty fear.

### 2.2 Adopt diversified teaching methods to improve teaching quality

The application of mathematical modeling in mathematics teaching in colleges and universities should adopt diversified teaching methods and introduce mathematical modeling into mathematics classroom flexibly. For example, teachers can introduce practical cases related to the course content, such as population growth model and traffic flow analysis, and demonstrate the description and solution process of mathematical problems through mathematical modeling, so that students can intuitively see the application of mathematical theories in practical problems, thus enhancing their understanding of theoretical knowledge. For example, in the teaching of inequality, the teacher proposed that "a taxi in a place charges 5 yuan within 2 kilometers, and then charges 1.2 yuan per kilometer, and takes a taxi in two places costs 14.2 yuan, and solves the inequality about distance x" [2]. Teachers guide students to solve problems with mathematical modeling ideas, and stimulate students' interest in mathematics learning. Teachers can introduce project-based learning, form a mathematical modeling team, design a series of projects related to mathematical modeling, and require students to work together to complete mathematical modeling problems, so as to cultivate students' teamwork ability. The flipped classroom teaching mode can be adopted. Before class, teachers can provide videos, articles and other resources related to mathematical modeling, so that students can learn independently. In class, focus on group discussion, problem solving, give full play to students' independent learning ability, but also deepen students' understanding of mathematical modeling. In teaching, teachers should actively use digital technology to help students quickly construct and solve mathematical models. Teachers can show the modeling process of mathematical problems on multimedia, so that students can intuitively understand the process and results of mathematical modeling, and improve teaching efficiency. Colleges and universities can also hold mathematical contests in modeling regularly to encourage students to apply their mathematical knowledge to solve practical problems and exercise their mathematical modeling ability.

### 2.3 Establish a mathematical modeling laboratory to promote exchange research

With the help of the mathematical modeling studio, students who have participated in the mathematical modeling contest over the years and those who are interested in modeling are invited to carry out mathematical modeling practice activities in a planned way, which is conducive to cultivating students' mathematical modeling ability and cultivating high-quality mathematical talents [3]. Therefore, colleges and universities should set up mathematical modeling laboratories with resources inside and outside the school to provide students with a platform integrating teaching, scientific research and practice. In the mathematical modeling laboratory, students can communicate with each other, have access to more mathematical modeling projects and research topics, and discuss with teachers and classmates how to solve

mathematical problems with mathematical modeling. The laboratory should hold academic lectures, seminars and other activities on a regular basis, requiring experts, scholars and teachers with rich experience to give lectures, challenging students' mathematical vision and expanding their mathematical knowledge.

## Conclusion

To sum up, the application of mathematical modeling in college mathematics teaching is conducive to improving teaching quality and cultivating students' innovative ability, which is very important for students' future development. The application of mathematical modeling in mathematics teaching in colleges and universities requires teachers to change the traditional teaching concept, respect the principal position of students, and strengthen the personalized guidance to students. At the same time, teachers should adopt diversified teaching methods and integrate mathematical modeling into curriculum teaching. Universities can also set up mathematical modeling laboratories to promote the further development of students' mathematical modeling ability. Through the implementation of the above measures, more high-quality mathematical talents with mathematical literacy and innovative ability can be cultivated.

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