Mathematical Statistical Method for Environmental Performance Evaluation of Low Carbon Energy

Yonglin Guan
Sichuan Technology & Business College, Dujiangyan, Sichuan Province, China

Abstract. China's development shows that its industrial development level has a great correlation with the establishment of mathematical economic models. China's industrial trade has become more and more mathematical and quantitative, and the creation of mathematical economic models will run through all aspects of China's industrial trade. This paper is a simple research and analysis of the role of industrial economic modeling in mathematics in China's trade environment.

1. Introduction
The establishment of economic models in mathematics exists in almost every aspect of the economic and trade environment, which has a very important analytical role for economic trade. For example, if a production company produces a product that needs to purchase raw materials, it needs to make a simple record of the quantity, quality, delivery date, and transportation mode of the purchased materials, and the establishment of the economic model is to make a complete statistics on the data. It can facilitate enterprises and suppliers to communicate on business needs in the first time. Therefore, the establishment of the economic model plays an important role in China's economic and trade.

2. How to build a mathematical model

2.1. Establish three stages of the mathematical economic model
Mathematical modeling can be roughly divided into three processes. The first step is to transform the economic data in life into a mathematical concept; then apply the mathematical concept to analyze the problem, which is to conduct a more in-depth study and discussion on the established economic model; the third step is to reapply the mathematical concept to reality in life.

2.2. Process circle of mathematical economic model
Mathematical economic modeling, in addition to using the above three processes to summarize the accident, can also be represented by the process circle method. The so-called process circle consists of six links. The first link: encountering economic problems in real life, first in-depth observation and research, discovering its basic characteristics, and simplifying the problem; the second link: translating the information learned through the first link into a mathematical language, this is commonly referred to as Mathematical economic model. The third link: based on the mathematical economic model established in the previous link, applying mathematical knowledge to find the answer related to this economic model; the fourth link: applying the mathematical language to simplify the mathematical economic model, so that everyone can see at a glance; the fifth link: Based on the background of the first part of the question, the economic model is further explained; the last link is the test of the results.
of the economic model. If the obtained value is not much different from the actual situation data, it indicates that the economic model is established successfully, and the establishment of the economic model is invalid.

2.3. Classification of mathematical economic models
The establishment of mathematical economic models can be roughly divided into two categories: probability type and deterministic type. The economic model of the probability type deals with the model of the problem randomly; the second type is judged based on the comparison between the experimental results and the original data. But mathematics was originally a huge subject, so the types of its models appeared different branches. For economic problems in real life, it is generally the method of applying the above model, but the method is not unique and can find different solutions according to specific needs. Therefore, the establishment of a mathematical economic model is a complex process.

3. Fuzzy Analytic Hierarchy Process (FUZZY-AHP)
Fuzzy analytic hierarchy process is a method that combines fuzzy mathematics theory with analytic hierarchy process to comprehensively evaluate data obtained from different aspects of complex social economy and scientific management. Firstly, the method uses AHP to analyze complex socio-economic problems. According to the nature of the problem and the overall goal to be achieved, the factors are clustered at different levels to form a multi-level analytical structure model, and finally the system is reduced to the bottom. The determination of the relative importance weights relative to the highest level or the ranking of the relative merit sequences. Secondly, based on the fuzzy mathematics theory, the principle of fuzzy relational synthesis is not applied, and some factors with unclear boundaries and difficult to quantify are quantified, which is suitable for the overall evaluation of things with regular uncertainty. In recent years, fuzzy analytic hierarchy process is used in academics. It has been widely applied and promoted in the world and social life, and has achieved remarkable results.

The key to fuzzy analytic hierarchy process is to establish a fuzzy judgment matrix between factors to represent the importance of each factor, and then convert the priority relationship matrix into a fuzzy consistency matrix to make people there is no contradiction in judging the importance of the factors. Then we calculate the index weights, normalize the Li, and finally combine the weights and the original values of the indicators to get the final comprehensive evaluation score.

4. Practical application of mathematical economic model establishment
The application of mathematical economic models in real life, especially in economic and trade, has achieved good results, and these achievements are manifested in all aspects of economic trade. The following is a practical example of real life to illustrate the effectiveness of mathematical economic models in economic trade. In real production, the raw material supplier of the procurement department of the enterprise must consider the storage cost of raw materials and the cost of raw materials. The reality is that if the company purchases too much raw materials at one time, it will increase the storage capacity of the warehouse and increase the storage cost and financial cost. If the raw materials are accumulated in the warehouse for a long time, the resources will be idle and the capital cost will be incurred. However, if the amount of one-time purchase is small, the opportunity will lead to repeated purchases in the later period, so that the purchase cost will be repeatedly calculated, and there will be insufficient supply of raw materials in the production process and the supplier will not deliver the goods in time, which will cause the company to stop working and wait for the production. It is. Therefore, in order to reduce or eliminate the consequences of the above reasons, we urgently need to effectively plan the purchase quantity and time nodes corresponding to the position and the quantity of inventory. In other words, the development of a reasonable procurement plan to minimize the cost of procurement, and the minimum cost of procurement is based on the minimum amount of storage and ordering costs of the warehouse in the whole year or a cycle. Another way of saying it is called the
most economical point of total cost. The establishment of the mathematical economic model exists in order to solve the above procurement problems. It can be seen that the establishment of the mathematical economic model has a great effect on the production of the enterprise, and it can control the cost and ensure the orderly execution of the production plan.

5. Low carbon economic indicator system judgment matrix

(a). Constructing a fuzzy judgment matrix of target layer A

In the target layer, the most important is the technical development indicators, followed by the economic development indicators and the environmental development indicators. The importance of the two can be considered to be basically the same, and the subsequent social development indicators can be considered relatively important. Therefore, based on this, a priority relationship matrix can be established.

| A   | B1  | B2  | B3  | B4  |
|-----|-----|-----|-----|-----|
| B1  | 0.5 | 1   | 0   | 0.5 |
| B2  | 0   | 0.5 | 0   | 0   |
| B3  | 1   | 1   | 0.5 | 1   |
| B4  | 0.5 | 1   | 0   | 0.5 |

Convert the target layer A priority matrix into a fuzzy consistency matrix

| A   | B1  | B2  | B3  | B4  |
|-----|-----|-----|-----|-----|
| B1  | 0.5 | 0.6875 | 0.3125 | 0.5 |
| B2  | 0.3125 | 0.5 | 0.125 | 0.3125 |
| B3  | 0.6875 | 0.875 | 0.5 | 0.6875 |
| B4  | 0.5 | 0.6875 | 0.3125 | 0.5 |

(b). Constructing Fuzzy Judgment Matrix of Criteria Layer B1

In the dimension of economic development, it should be said that the proportion of environmental protection industry to GDP and the proportion of high-tech industry to GDP are very important, followed by the proportion of tertiary industry in GDP and the proportion of employees in the tertiary industry. Relatively low. Therefore, based on this logical relationship, a priority relationship matrix is established.

| B1  | C1  | C2  | C3  | C4  | C5  |
|-----|-----|-----|-----|-----|-----|
| C1  | 0.5 | 0   | 0   | 0   | 0   |
| C2  | 1   | 0.5 | 0.5 | 0   | 0   |
| C3  | 1   | 0.5 | 0.5 | 0   | 0   |
| C4  | 1   | 1   | 1   | 0.5 | 0.5 |
| C5  | 1   | 1   | 1   | 0.5 | 0.5 |

Converting the criterion layer B1 priority relation matrix into a fuzzy consistency matrix
Table 4. Criteria layer B1 fuzzy consistency matrix

| B1  | C1    | C2    | C3    | C4    | C5    |
|-----|-------|-------|-------|-------|-------|
| C1  | 0.5   | 0.35  | 0.35  | 0.15  | 0.15  |
| C2  | 0.65  | 0.5   | 0.5   | 0.3   | 0.3   |
| C3  | 0.65  | 0.5   | 0.5   | 0.3   | 0.3   |
| C4  | 0.85  | 0.7   | 0.7   | 0.5   | 0.5   |
| C5  | 0.85  | 0.7   | 0.7   | 0.5   | 0.5   |

(c). Constructing Fuzzy Judgment Matrix of Criteria Layer B2

Among the three indicators of the social development dimension, the Engel coefficient and the disposable income growth rate can reflect the people's living standards. The reason why these indicators are included is because in the evaluation of low-carbon economic indicators, people the standard of living will also greatly affect the energy structure of the application, such as high energy consumption, high pollution, coal-based energy structure, or energy structure based on renewable energy and clean energy. In the comparison of the two, the former reflects a state, while the latter reflects a trend. The former should have a greater impact on the low-carbon economy than the latter. Therefore, it is important to regard the Engel coefficient here. The growth rate of per capita disposable income in rural areas is less important.

Table 5. Criteria layer B2 priority relationship matrix.

| B2  | C6    | C7    | C8    |
|-----|-------|-------|-------|
| C6  | 0.5   | 1     | 1     |
| C7  | 0     | 0.5   | 0.5   |
| C8  | 0     | 0.5   | 0.5   |

Converting the criterion layer B2 priority relation matrix into a fuzzy consistency matrix

Table 6. Criteria layer B2 fuzzy consistency matrix.

| B2  | C6    | C7    | C8    |
|-----|-------|-------|-------|
| C6  | 0.5   | 0.75  | 0.75  |
| C7  | 0.25  | 0.5   | 0.5   |
| C8  | 0.25  | 0.5   | 0.5   |

(d). Constructing Fuzzy Judgment Matrix of Criteria Layer B3

In the dimension of technological development, the most important is the energy consumption per unit of GDP and the carbon emissions per unit of GDP. The second most important is the utilization rate of industrial waste and the proportion of renewable energy. The relatively low importance is the proportion of R&D expenditure to GDP. Based on this, build a priority relationship matrix as follows:

Table 7. Criteria layer B3 priority relationship matrix.

| B3  | C9    | C10   | C11   | C12   | C13   |
|-----|-------|-------|-------|-------|-------|
| C9  | 0.5   | 0.5   | 1     | 1     | 1     |
| C10 | 0.5   | 0.5   | 1     | 1     | 1     |
| C11 | 0     | 0     | 0.5   | 0.5   | 1     |
| C12 | 0     | 0     | 0.5   | 0.5   | 1     |
| C13 | 0     | 0     | 0     | 0     | 0.5   |

Converting the criterion layer B3 priority relation matrix into a fuzzy consistency matrix
Table 8. Criteria layer B3 fuzzy consistency matrix.

| B3 | C9 | C10 | C11 | C12 | C13 |
|----|----|-----|-----|-----|-----|
| C9 | 0.5| 0.5 | 0.7 | 0.7 | 0.85|
| C10| 0.5| 0.5 | 0.7 | 0.7 | 0.85|
| C11| 0.3| 0.3 | 0.5 | 0.5 | 0.65|
| C12| 0.3| 0.3 | 0.5 | 0.5 | 0.65|
| C13| 0.15| 0.15| 0.35| 0.35| 0.5 |

(e). Constructing Fuzzy Judgment Matrix of Criteria Layer B4
Among the dimensions of environmental development, the more important ones are urban per capita green area and urban green space coverage. The importance of forest coverage is second. The area ratio of nature reserves is relatively low, and the priority relationship matrix is constructed in turn:

Table 9. Criteria layer B4 priority relationship matrix.

| B4 | C14 | C15 | C16 | C17 |
|----|-----|-----|-----|-----|
| C14| 0.5 | 0  | 0   | 1   |
| C15| 1   | 0.5| 0.5 | 1   |
| C16| 1   | 0.5| 0.5 | 1   |
| C17| 0   | 0  | 0   | 0.5 |

Convert the criterion layer B4 priority relation matrix into a fuzzy consistency matrix

Table 10. Criteria layer B4 priority relationship matrix.

| B4 | C14 | C15  | C16  | C17  |
|----|-----|------|------|------|
| C14| 0.5 | 0.3125| 0.3125| 0.625 |
| C15| 0.6875| 0.5  | 0.5  | 0.8125|
| C16| 0.6875| 0.5  | 0.5  | 0.8125|
| C17| 0.375 | 0.1875| 0.1875| 0.5  |

6. Analysis of the Advantages of Mathematical Economic Modeling in Economic Trade
Through the above analysis, we can see that the establishment of the mathematical economic model is to take the overall perspective to control the production activities in economic and trade, and to optimize the production plan with the most optimized resources, which can save a lot of difficulties in computational analysis. Optimization of economic benefits. The advantage of mathematical economic modeling lies in its use of mathematical language, using forms and computers to solve problems, and finally to obtain an optimal solution to reduce human, financial and material costs. Another advantage of mathematical economic modeling is that it can avoid the impact of people and the environment on the results. The whole process is analyzed by mathematical methods to reach the maximum economic effect. At the same time, mathematical economic modeling is not limited to an economic goal. It can complete multiple economic indicators at the same time, so that the best one is selected as a solution, so that the enterprise can develop steadily in a complex and ever-changing social environment. All in all, the creation of mathematical models is already a scientific and avant-garde way in economic trade. Nowadays, most companies have used such a way to solve some economic problems and have good prospects.

7. Conclusion
The establishment of the mathematical economic model has a very broad application prospect and provides reference materials for decision makers. Moreover, it can provide meticulous guidance to many organizations, which can effectively save costs, reduce losses, and improve economic benefits. Therefore, this method has a great impact on economic and trade and has produced good results. On
this basis, we should strive to develop, use our wisdom and labor to create mathematical economic models, and at the same time sum up experience in practice, let the mathematical economic model be better applied in economic and trade, and promote China's economic development.

References

[1] Qiao Taotao; application of mathematical model in structural design process [J]; Cai Zhi; 2017(18):11-14.

[2] Xia Wei; Li Qiuli; Ding Yanfeng; Exploration of the Infiltration of Mathematical Modeling Thoughts in Mathematical Statistics Teaching in General Medical Colleges [J]; Journal of Mathematical Medicine; 2016(02):33-37.