Research on the Application of Computer Technology in Economic Analysis Combined with Higher Mathematics Modeling

Zhou Lei1,*
1Shandong Light Industry Vocational College, China
*Corresponding author e-mail: zhoulei@silkedu.com

Abstract. In recent years, the development of science and technology in China rapidly, as has the development of computer technology. Therefore, in the economic and management process, the application of computer technology and mathematical knowledge has become more extensive and in-depth. In the process of solving many economic problems, it is necessary to apply computer technology and mathematical models to ensure the scientific nature of decision-making. Computer technology and higher mathematics are widely used in various fields in our country, and corresponding achievements have also been made. In economic analysis of our country, it mainly provides an important guarantee for economic analysis modeling, thereby effectively improving the quality and efficiency of economic analysis. This article mainly analyzes the influence and function of computer technology combined with higher mathematical modeling in financial and economic analysis, and discusses its application in economic analysis[1]. The knowledge of higher mathematics is rich, including not only probability theory and calculus, but also linear mathematics. Due to the needs of the industry, each part of knowledge plays an important role in each industry. Especially the application in economic analysis can effectively improve the efficiency of economic analysis. In many applications, higher mathematics is transformed into other knowledge to provide corresponding services for economic construction[2-3].

Keywords: Higher Mathematics, Economic Analysis, Computer Technology, Application

1. The influence and function of higher mathematics in financial and economic analysis

1.1. Mathematical methods enable economic analysis to simplify the object of study
Economic analysis itself belongs to a very complex analysis process, in the process of its analysis, it is necessary to obtain the final conclusion through many work, such as data acquisition and model establishment. In the process of economic theory analysis, if there is no data to support it, it will lose the role of economic analysis, and can not achieve good results. The application of higher mathematics for economic analysis can not only improve the richness of data acquisition content, but
also improve the scientific and accuracy of data information collection through in-depth data mining, and give good data support to economic analysis. At the same time, it can also promote the establishment of mathematical model and form the final icon, make it easier to clarify the object of economic analysis, and provide the corresponding economic analysis report for the process of enterprise development, so as to promote the rapid development of enterprises.

1.2. The introduction of mathematical methods is conducive to unity and the improvement of modern economic analysis

In the process of economic analysis, it is necessary to use scientific and reasonable analytical methods, so as to effectively improve the efficiency and quality of economic analysis work. The use of mathematical analysis in economic analysis is one of the most effective ways, mainly because of its very tight and highly logical advantages, can achieve good compensation for the traditional methods used in economic analysis, accurate and comprehensive definition of the basic concepts applied in the process of economic analysis, for example, economic analysis on supply, preference and other related concepts, so as to effectively avoid ambiguity caused by the concept or some academic aspects of the argument; can also play a good normative role in economic analysis, promote the economic analysis of the basic concepts used in the process of economic analysis and the development of the effective complement to the traditional methods of economic analysis, and promote the scientific analysis of the use of good conditions, can also make clear use of economic analysis in the analysis of economic analysis, In the process of economic analysis, the application of advanced mathematical analysis method to realize the organic combination of the two can play their respective advantages, thus can effectively enhance the actual effect of economic analysis work, play an important role and significance.

2. The basic application of higher mathematics in economic analysis

2.1. Using function model to study related problems

There are many kinds of mathematical functions. In economic analysis, correlation analysis is generally carried out through economic modeling. In the process of studying related economic problems, the model is generally used for economic analysis. Through the effective application of the model, the actual changes of the economy can be compared and analyzed, which provides a good basic guarantee for the subsequent economic analysis. In the actual economic analysis work, there are many cases related to the use of functions to solve the problems. For example, in the expression of the relationship between market and supply and demand, functions can be used to construct the corresponding relationship diagram, and then more effective economic analysis can be carried out on the basis of graphic model. In the process of today’s economic development, Using function model to analyze and study the corresponding economic problems is in line with the needs of the development of the current era, and it is also the most important and effective way to solve the working difficulties in economic analysis.

2.2. Application of elasticity in economic analysis

Based on the analysis of the definition of Taoism, we can know that if the function \( y = f(x) \) is derivable, that is to say, it can be said that \( f(x) \) exists, so

\[
\lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{\Delta x \to 0} \frac{x_0}{f(x_0)} \cdot \frac{\Delta y}{\Delta x} = \frac{dy}{dx} \bigg|_{x=x_0}
\]

You can call it an elastic function called \( f(x) \), and you can record it as an elastic function.
By analyzing its essence, it can be regarded as the relative change rate, which can be expressed as the reaction sensitivity after the relative change of dependent variables to independent variables. The application of elastic concept in the actual process of economic analysis is mainly because the concept of elasticity is one of the important components in economics, and it is also one of the most important tool concepts used in economic analysis. It is widely used in the research of production, demand and other related economic analysis problems in economic analysis. It is mainly for the correlation quantitative analysis of the relationship between various economic quantities, and for a dependent variable or economic variable, its elasticity can be defined as the amplitude (percentage) of the change of economic variable caused by the self-variable value of 1% formed by the economic variable.

Ep is a kind of demand elasticity which is often used in economic analysis. Ep is analyzed, which mainly includes demand Q and price P, while Ep is mainly used to express the degree of response of Q to P, which can be divided into three cases:

First, if IEpI is greater than 1, Q is flexible for P, and at this time, the change of commodity demand is obviously higher than that of price change, among which the factor that has the greatest influence on demand is mainly price change, which is generally the case of luxury goods in real society.

Second, if IEpI is equal to 1, it can be referred to as demand as unit elasticity for price, and at this time the percentage range of change in demand is also equal to the percentage range of price change.

Third, if the IEpI is less than 1, it can be called the demand side is low for the price. At this time, when the percentage change of commodity demand is compared with the percentage of price change, the former is also obviously lower than the latter, and the demand will be slightly affected by the price change. For example, in today's market, this is the case of daily necessities.

2.3. Application of differential equation in economic problem analysis
Differential equation is one of the most important components in higher mathematics. Differential equation plays a very important role and position in solving economic analysis problems. Therefore, differential equation is used in economic analysis. For example, in the prediction of commodity sales, the sales volume with known commodity growth rate can be calculated by differential equation; in addition, the output of renewable resources can be predicted well; the application of differential equation can also be used to improve the effect and quality of the overall economic analysis, and the economic benefit of the mechanism can be effectively improved.

2.4. Application of probability and mathematical statistics in risk measurement
In the actual economic activities, we often encounter several situations that can be selected at the same time. At this time, based on a variety of selection of relevant staff, we can select the best quality solutions to solve the corresponding problems, which is called risk decision-making. In general, the expected value decision method is used for this kind of problems. For example, a bookstore makes an order business for the calendar of each year to the publishing unit. In this article, it is assumed that the unit price of each calendar is 80 yuan per copy, and the cost price required for the production of the calendar is 50 yuan / book, based on the experience of the bookstore in selling the calendar every year. If the calendar is not sold on the last day of each year, the bookstore must reduce the price. Reduce the price of each calendar to 20 yuan per copy for sale, the following is the sales probability table before the last day of each year (such as Table 1):
Table 1. Sales probability of calendar before the last day of each year.

| quantity of sale | 150 | 160 | 170 |
|------------------|-----|-----|-----|
| probability      | 0.3 | 0.3 | 0.4 |

How many calendars should the bookstore order from the publisher each year to ensure maximum profit?

The specific solution is as follows: before the last day of each year, the bookstore can get a profit value of 30 yuan per copy minus the unit price of the calendar sales. If you sell it after the last day of each year, you will lose 30 yuan per calendar. Based on this, the bookstore operator can take the following three schemes to sell the calendar, setting the order quantity at 150, 160, 170, and recording it as the event $A_1$, $A_2$, $A_3$, respectively. Instead, the last day of the year is recorded as $B_1$ to $B_3$, and the conditional profit of the $A_i$ can be finally recorded by the $B_i$ during the $A_i$ occurrence, as follows (see Table 2):

Table 2. $A_i$ conditional profit list.

|   | $B_1$ | $B_2$ | $B_3$ |
|---|-------|-------|-------|
| $A_1$ | 4500  | 4500  | 4500  |
| $A_2$ | 4200  | 4800  | 4800  |
| $A_3$ | 3900  | 4500  | 5100  |

From this we can see that $A_i$ is unpredictable, which scheme to choose mainly depends on which kind of profit is the highest. The profits are as follows:

$E_1 = 4500 \times 0.3 = 4500$ (元)

$E_2 = 4200 \times 0.3 = 4620$ (元)

$E_3 = 3900 \times 0.3 = 4560$ (元)

Figure 1. Formula one.

It can be seen from this that the second scheme should be selected for ordering.

3. Conclusion
To sum up, computer technology combined with higher mathematical modeling plays a very important role in economic analysis. Therefore, in the course of teaching, we must fully combine the knowledge of economic field, impart the economic mathematical model, and combine the theory and application organically.

References
[1] kurg. An analysis of the economic application of calculus in higher mathematics [J]. Mathematics Learning and Research, 2019 (15): 14.
[2] Tao xiaojing, Yang xiong. Thoughts on integrating mathematical modeling into mathematics teaching in higher vocational colleges [J]. Yinshan academic journal, 2017(2): 20-25.
[3] Zhang meiling, Zhao youyi. Infiltration of mathematical modeling thought in college mathematics teaching [J]. Journal of chifeng university, 2017(2): 25-26.