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Research Article

Cost Accounting Algorithm of Environmental Pollution Control Based on Discrete Probability

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Aiming at the problems of high error rate and long time of traditional environmental pollution control cost accounting algorithm, a cost accounting algorithm of environmental pollution control based on discrete probability was designed. Firstly, the cost of environmental pollution is classified and the monetization function of environmental pollution cost is constructed. Then, the cost accounting index system of environmental pollution control is established, and the cost function of environmental pollution control is constructed. Finally, a discrete probability model is used to optimize the cost function, and the optimized cost function is used to design the environmental pollution control cost accounting algorithm. The experimental results show that the proposed algorithm can quickly converge to the optimum within 70 iterations, the accounting error rate is between -0.2% and 1.3%, and the accounting time is always less than 0.4 s. It has good convergence and can accurately calculate the cost of ecological environmental pollution control.

1. Introduction

Since the 1960s, the change of the natural environment has gradually posed a more and more serious threat to human survival. Among the environmental problems, environmental pollution is the most concerned and has the greatest impact on people's daily life [1]. Since the 1970s, economists have focused their research vision on the field of environmental pollution in environmental problems, creating a new direction of research, namely, the cost of environmental pollution control [2, 3]. Environmental treatment cost refers to the operation cost of environmental pollution control, including depreciation cost of fixed assets, maintenance cost, labor cost, electricity cost, and consumption of various materials in the process of treatment. But so far, there is no perfect method for the cost accounting of environmental pollution control, so the research on the calculation algorithm of environmental pollution control cost has been studied great concern.

In [4], a cost accounting algorithm for environmental pollution control based on activity-based costing method was proposed by analyzing the composition of treatment cost. According to the actual needs of the algorithm, through the establishment of resource cost database, activity-based cost database, and cost driver evaluation and allocation, the algorithm process of environmental pollution control cost accounting is designed, and the management cost allocation model is further proposed, in order to provide the basis for the cost management of environmental pollution control. However, the design of the algorithm is too simple and the factors considered are less, which lead to the increase of the error rate of environmental pollution control cost accounting, and the actual application effect is poor. In [5], in order to improve the scientificity, rationality, and practicability of the cost accounting process of environmental pollution control, a multiattribute analysis-based cost accounting algorithm for environmental pollution control was proposed. Firstly, the algorithm makes multiattribute analysis on the environmental pollution control projects and indirect cost objects and then designs the cost accounting algorithm of environmental pollution control by combining qualitative and quantitative methods according to the actual situation and historical data. Through the coordinated control of multiattribute and weight, the accurate accounting of environmental pollution control cost can be realized. However, the method is too complex and has a kernel and the calculation time is long. In [6], in order to quickly and accurately obtain the best scheme for environmental pollution control, a cost accounting algorithm for environmental pollution control based on BP neural network was designed. This method takes the efficiency and quality of pollution treatment as constraints, constructs the cost of environmental pollution control as the objective function, and designs the cost accounting algorithm of pollution control by combining multiple linear regression and BP neural network according to the results of the objective function. However, this method has many problems such as long calculation time and high error rate, so the practical application effect is not good.

In order to solve the problems of the above algorithm, this paper designs an environmental pollution control cost accounting algorithm based on discrete probability, in order to improve the efficiency of environmental pollution control cost accounting and reduce the accounting error. The specific research ideas of this paper are as follows.

Firstly, the connotation and classification of environmental pollution cost are clarified, and the monetization function of environmental pollution cost is constructed.

Secondly, the cost accounting index system of environmental pollution control is established and the cost function of environmental pollution control is constructed.

Then, the cost function is optimized by the discrete probability model, and the optimized cost function is used to design the environmental pollution control cost accounting algorithm.

Finally, the convergence, accounting error rate, and calculation time of the environmental pollution control cost accounting algorithm are used as experimental indicators to verify the experimental results.

2. Design of Cost Accounting Algorithm for Environmental Pollution Control

2.1. Connotation and Classification of Environmental Pollution Cost

2.1.1. Connotation of Environmental Pollution Cost. The cost of environmental pollution refers to the cost loss caused by the reduction of the value of the environment due to unreasonable human activities. Generally, the cost of environmental pollution can be divided into environmental recession cost and environmental prevention and control expenditure cost. The cost of environmental degradation mainly refers to the loss cost caused by the decline of the quality and value of environmental resources caused by unreasonable human activities, and the expenditure cost of environmental prevention and control refers to the expenditure spent to enhance the quality value of declined environmental resources [7].

2.1.2. Cost Classification of Environmental Pollution

(1) Classification according to different production links is as follows:

The cost of environmental pollution can be divided into preparation stage, production stage, and maintenance stage. The cost of environmental pollution in preparation stage refers to the cost of avoiding environmental pollution before production [8]. Specifically, it includes the installation and commissioning of environmental protection facilities, the publicity and education of environmental protection concept, the measurement of geographical and geomorphic environment in surrounding areas, etc. The cost of environmental pollution in the production stage refers to the cost of environmental loss in the production process; for example, a large amount of sewage and waste will be discharged in the production process, which belongs to the environmental pollution cost in the process of maintenance after the completion of the production process and the expenditure for environmental protection work; that is, the pollution department or enterprise will repurify the waste gas and sewage generated by itself, so the cost generated belongs to the category of recycling cost [9].

(2) Classification by expenditure purpose is as follows:

Environmental pollution cost can be divided into energy conservation and emission reduction cost, protection cost, technology research cost, public activity cost, and other environmental protection expenditures according to different expenditure purposes. The cost of energy conservation and emission reduction refers to the expenditure for saving energy and reducing pollutant emissions in production, such as the introduction of environmental protection industrial equipment and production lines and the operating costs of various green systems. The protection cost refers to the protection expenses invested to prevent environmental pollution in the whole development process, such as the purchase of environmental protection facilities and the publicity of environmental protection ideas. The cost of technology research mainly refers to the cost of strengthening environmental protection, such as the cost of improving the technological process and the research and development of environmental protection technology [10]. The cost of public activities refers to the cost of social environmental protection activities taken for social public welfare, such as the sponsorship provided for the activities of some environmental protection organizations, which belong to the public welfare expenditure cost. Other environmental protection expenditures refer to the cost consumption of environmental protection nature in addition to the costs listed above. This includes various fines and environmental taxes collected and paid by government agencies for environmental pollution enterprises.

(3) Classification according to the length of amortization time is as follows:

The cost of environmental pollution is divided into long-term environmental pollution cost and short-term environmental pollution cost according to the length of amortization time. The long-term environmental pollution cost refers to the various expenses that need to be paid continuously for the prevention and control of environmental pollution in a relatively long period of time, such as the various sewage charges paid to the environmental protection department on a regular basis. The short-term environmental pollution cost expenditure refers to the expenses that need to be paid at one time in order to prevent and control environmental pollution at a certain time point, such as the need for coal mining enterprises to obtain coal mining rights, the cost of one-time expenditure, and the expenditure of establishing sewage treatment plant [11].

2.2. Construction of Environmental Pollutant Cost Monetization Function. Generally, the cost calculation procedure of environmental pollutants is complicated. The procedure of cost calculation should be strictly selected from the selection of initial calculation items, the establishment of calculation method, and currency conversion. Generally speaking, the general steps of environmental pollutant cost monetization function can be divided into the following three steps:

(1) Determine the impact factors and calculate the project:

Determining the influencing factors and calculation items of environmental pollutant cost is the premise of environmental pollutant cost monetization. Only when the impact factors and calculation items are clearly understood can we grasp the key points and have a definite target [12]. There are many kinds of environmental problems in various regions, but the environmental pollution problems in specific areas have their own priorities, which cannot be copied. Therefore, the calculation of the cost of environmental pollutants should grasp the main characteristics according to their respective economic and social characteristics and environmental problems. It is not necessary to calculate everything; otherwise, the work will be twice as good as half.

(2) Establish the reaction relationship between environmental pollution and physical loss and calculate the loss:

After defining the impact factors and calculating the project, the specific loss can be measured according to the environmental pollution status. The state of environmental pollution can be expressed by the concentration of environmental pollutants or other indicators. Therefore, it is important to establish the reaction relationship between the concentration of environmental pollutants and other expressed quantities and physical loss [13]. According to the main ways of environmental pollution affecting physical objects, it can be summarized into three types of paths: chain path, that is, the destruction of certain environmental pollution on the physical impact can be transmitted according to the chain of causality; the fan path, that is, a certain environmental pollution hazard can cause multiple negative effects in a fan-shaped manner; the network path, that is, all kinds of environmental damage can cause comprehensive effects in the form of network. It is helpful to construct the cost loss response relationship by defining the impact form of environmental hazards. From the perspective of the whole influence path, the chain path shows the connection relationship, the fan path shows the combination relationship, and the network influence shows the cross relationship [14]. The functional relationship between the state of environmental damage and various physical hazards can be expressed by the following formula:

$$F_{ij} = \left(D_i, S_i, T_j, \partial_{ij}\right). \tag{1}$$

In the above formula, F_{ij} represents the loss of j-th category physical object caused by i-th category environmental damage, D_i represents the magnitude under i-th category environmental pollution, S_i represents the class i environmental standard, T_j represents the magnitude under j-th category physical condition, and ∂_{ij} represents the calculation parameter of j-th category physical loss caused by i-th category environmental pollution.

In this exposure response function, D_i, S_i, and T_j are known quantities, while parameter ∂_{ij} is unknown. The value of ∂_{ij} is mainly determined by three factors. Firstly, ∂_{ij} depends on the separability of environmental pollution factors, such as the emission of sulfur dioxide gas in the air, which increases the incidence rate of human respiratory diseases. The loss and harm caused by sulfur dioxide can be separated from the environmental impact of human health. Secondly, ∂_{ij} depends on the testability after separation from the state of environmental damage. The more measurable ∂_{ij} is, the more specific and easier it is to calculate. Otherwise, ∂_{ij} is fuzzy. Thirdly, ∂_{ij} depends on the function type of environmental pollution exposure response relationship. If a function is expressed in terms of power function, exponential function, and linear type, then their ∂_{ij} values and meanings are different.

To sum up, in order to construct the reaction relationship of environmental pollutants, it is necessary to separate the influencing factors of environmental pollution and have measurability, so as to accurately calculate and process them through the reaction relationship of environmental pollutants [15].

(3) Constructing monetization function:

When the loss of physical quantity is calculated and processed, the loss is converted into monetary loss according to relevant regulations. As the loss of physical quantity often involves multiple value losses, the process of converting the loss of physical quantity into monetary loss is more complicated. For example, air pollution will not only cause the loss of human health but also cause the loss of crop yield and quality and also cause serious loss of forest damage [16–20]. In addition, some environmental pollution will not only cause losses to human society but also damage the natural environment. The impact path of these losses of physical quantity is different: some belong to direct influence, some belong to indirect influence, some belong to selection value, and some belong to existence value, so their monetization path is also different. In a general sense, the monetization function of the loss of physical quantity into monetary loss can be expressed by the following formula:

$$M_{jk} = \left(F_{ij}, P_{jk}\right). \tag{2}$$

In the above formula, M_{jk} represents the quasi monetization loss caused by the loss of physical quantity of the j-th category, and P_{jk} represents the price of the k-th type of monetary loss caused by the j-th type of physical quantity loss.

Through this monetization function, we can express the characteristics of multiple value losses of the same kind of physical quantity loss. In formula (2), how to establish price P_{jk} under market conditions becomes the primary task. In ecological economics and environmental economics, direct loss can be calculated directly by market price, indirect loss can be calculated indirectly by shadow price or alternative price, and some existence loss can be calculated according to willingness to pay price. From the initial market price method to the final price method of willingness to pay, the influence of objective factors on price P_{jk} gradually decreases, while the degree of subjective factors gradually increases. Therefore, the rationality of price P_{jk} in monetization function mainly depends on the rationality of subjective will. In the process of monetization of physical loss, different measurement methods often lead to different errors. In general, the debate on the error caused by the market price method is relatively small, but the dispute caused by the alternative price method and shadow price method is larger. According to the price method of willingness to pay, the debate is the most intense, mainly because the price method of willingness to pay is most affected by subjective factors [21–24]. Therefore, in order to accurately calculate the monetary value of physical loss, it is the most important to select the appropriate environmental pollutant cost monetization function.

2.3. Design of Environmental Pollution Control Cost Accounting Algorithm Based on Discrete Probability. According to the above analysis, in order to reflect the corresponding relationship between resources and environment changes and governance costs, the cost accounting index system is established. The results are shown in Table 1.

2.3.1. Cost of Pollution Control. The cost of pollution prevention and control refers to the cost of purchasing and installing environmental protection equipment and the follow-up maintenance cost of the equipment due to the pollutant emission limit policy formulated by the national environmental protection department. The installed environmental protection equipment mainly includes dust removal equipment, desulfurization equipment, denitration equipment, wastewater treatment system, etc. [25–28]. The calculation formula of pollution control cost is as follows:

$$C_d = C_f + C_r. \tag{3}$$

In the above formula, C_d is the cost of pollution prevention and control, C_f is the purchase and installation cost of environmental protection equipment, and C_r is the maintenance cost of environmental protection equipment.

(a) Purchase and installation cost of environmental protection equipment:

Equipment purchase and installation cost mainly includes environmental protection equipment installation design cost, environmental protection equipment construction cost, and unforeseen cost, while environmental protection equipment construction cost includes environmental protection equipment purchase cost, equipment civil engineering cost, equipment installation cost, and construction cycle interest [29–31]. The calculation formula for the purchase and installation cost of environmental protection equipment is as follows:

$$C_f = f_0 \cdot H_{CRF}. \tag{4}$$

In the above formula, f_0 is the sum of the purchase and installation amount of environmental protection equipment in the power plant and the interest in the construction period, and H_{CRF} is the fund recovery coefficient. The calculation formula of fund recovery coefficient H_{CRF} is as follows:

$$H_{CRF} = i \times \frac{(1+i)^n}{(1+i)^n - 1}. \tag{5}$$

In the above formula, n is the service life of the equipment, and i is the social discount rate or benchmark rate of return.

(b) Maintenance cost of environmental protection equipment:

After the environmental protection equipment is completed and put into operation, while reducing the emission of various pollutants, there will be certain maintenance costs, and this part of the cost also accounts for a certain proportion. Operation and maintenance costs mainly include [32–34] the cost of raw materials, such as raw materials of the plant, water consumption, fuel consumption, and

Table 1: Cost accounting index system.

Criterion layer		Index layer: Physical measurement index	Index layer: Monetary value accounting indicators
Cost of environmental pollution control	Water pollution	Discharge of water pollutants	Cost of water pollution control
	Air pollution	Emission of air pollutants	Cost of air pollution control
	Solid waste pollution	Discharge of solid waste pollutants	Cost of solid waste pollution control
Cost of pollution control	Purchase cost	Purchase of environmental protection equipment	Purchase cost and installation cost of environmental protection equipment
	Maintenance cost	Maintenance cost of environmental protection equipment	Labor and other costs of environmental protection equipment maintenance

auxiliary power consumption; labor costs, including wages and bonuses paid to operation and maintenance personnel of environmental protection equipment [35–38]; maintenance cost, including the maintenance cost of various environmental protection equipment and the depreciation cost of each environmental protection equipment [39–41]. The maintenance cost of environmental protection equipment can be expressed by the following formula:

$$C_r = \sum_{i=1}^{n} r_i. \quad (6)$$

In the above formula, r_i is the maintenance cost of the i-th environmental protection equipment in the power plant.

2.3.2. Pollution Loss Cost

(a) Air pollutants:

Gas pollutants can be divided into two categories, namely, natural pollutants and man-made pollutants. Pollution is often caused by man-made pollutants, which mainly come from fuel combustion and large-scale industrial and mining enterprises [42].

Particulate matter refers to the atmospheric liquid; solid matter, also known as dust; sulfur oxide, which refers to the general term of sulfur oxides, including sulfur dioxide, sulfur trioxide, sulfur trioxide, and sulfur monoxide; carbon oxides, mainly including carbon dioxide and carbon monoxide; nitrogen oxide, which refers to the general term of nitrogen oxides, including nitrous oxide, nitric oxide, nitrogen dioxide, and nitrogen trioxide.

Hydrocarbon: it is a kind of compound formed by carbon and hydrogen, such as methane, ethane, and other hydrocarbon gases, and other harmful substances, such as heavy metals, fluorine-containing gases, and chlorine gases.

The calculation of emission cost of gaseous pollutants is shown in

$$G_a = \sum_{i=1}^{n} \left(F_{ei} \cdot G_i\right). \quad (7)$$

In the above formula, G_a is the emission cost of gas pollutants, F_{ei} is the charging standard of the i-th gas pollutant emission, and G_i is the total emission amount of the i-th gas pollutant.

(b) Solid pollutants:

Solid waste includes industrial solid waste and municipal solid waste. Agricultural solid waste causes relatively small environmental losses, so it is not considered. According to the types of industrial solid waste, it can be divided into seven categories: hazardous waste, coal gangue, tailings, smelting slag, fly ash, slag, and other wastes. Other wastes include industrial waste, sludge, and dust removed during fuel combustion. Coal gangue, tailings, smelting waste slag, fly ash, slag, and other wastes are classified as general industrial solid waste. Urban domestic waste is mainly divided into three categories: household garbage, street cleaning waste, and group waste. Among them, the quantity of domestic waste is the first, and its composition is the most complex, and its composition is affected by time and season. Street cleaning garbage comes from the cleaning of roads, streets, and alleys. Group waste refers to the waste generated in the production and work process of organs, groups, schools, factories, and the tertiary industry. The total cost calculation formula of solid pollutants is as follows:

$$G_e = F_{ei} + G_{ei} + E_{ei}. \quad (8)$$

In the above formula, G_e is the total cost of solid pollutants, F_{ei} is the cost of pollutant treatment, G_{ei} is the cost of treatment and storage of waste, and E_{ei} is the cost of treatment of discharged waste.

The calculation formula of F_{ei} is as follows:

$$F_{ei} = F_{eij} + F_{eik}. \quad (9)$$

In the above formula, F_{eij} represents the virtual treatment cost for the disposal of storage waste, and F_{eik} represents the treatment cost for the disposal of discharged waste.

The calculation formula of G_{ei} is as follows:

$$G_{ei} = g_i \times \left(g_j - g_k\right), \quad (10)$$

In the above formula, g_i is storage, g_j is disposal unit governance cost, and g_k is storage unit governance cost.

The calculation formula of E_{ei} is as follows:

$$E_{ei} = e_k \times e_i. \quad (11)$$

In the above formula, e_k is the amount of waste discharged and e_i is the unit treatment cost of discharged waste.

(c) Water pollution:

At present, about one-third of water pollutants in China come from industry, agriculture, tertiary industry, and residents' life. The wastewater quality and pollutant content of different industries are quite different. Even in the same industry, due to the different products, raw materials and auxiliary materials, process routes, and treatment methods, the wastewater quality is also quite different. Generally speaking, the pollutants in industrial wastewater mainly include organic pollutants such as COD, BOD_5, ammonia nitrogen, cyanide, phenols and petroleum, heavy metals, solid suspended solids, and air pollutants. At present, the five pollutants such as COD, ammonia nitrogen, petroleum, cyanide, and volatile phenol can be directly calculated by statistical data.

The cost of pollutants treatment in industrial wastewater is as follows:

$$R_e = \sum_{e=1}^{5} r_e \times z_e \times k_e, \quad (12)$$

where r_e represents the emissions of heavy metals, cyanide, COD, petroleum, and ammonia nitrogen in industrial wastewater, z_e represents the treatment cost of five pollutants in industrial wastewater, and k_e represents the pollutant removal rate in industrial wastewater.

The calculation formula of urban domestic wastewater treatment cost is as follows:

$$Q_e = \sum_{e=1}^{2} A_e \times B_e \times C_e. \quad (13)$$

In the above formula, A_e represents the discharge amount of COD and ammonia nitrogen in urban domestic wastewater, B_e represents the treatment cost of COD and ammonia nitrogen in urban domestic wastewater, and C_e represents the removal rate of COD and ammonia nitrogen pollutants in urban domestic wastewater.

The calculation formula of treatment cost of livestock and poultry wastewater is as follows:

$$F_e = w_i \times \left(w_e - w_k\right) + h_i \times \left(h_e - h_k\right), \quad (14)$$

In the above formula, w_i represents the ideal removal amount of livestock and poultry breeding wastewater after dry process application, w_k represents the actual removal amount of livestock and poultry breeding wastewater after dry process application, w_e represents the cost of dry treatment of livestock and poultry breeding wastewater, h_i represents the ideal removal amount of livestock and poultry breeding wastewater after wet application, h_e represents the actual removal amount of livestock and poultry breeding wastewater after wet process application, and h_k represents the wet treatment cost of livestock and poultry breeding wastewater.

On this basis, the total physical quantity of environmental pollution is calculated, and the calculation formula is as follows:

$$C_W = \sum_{i=1}^{I} T_i \times C_A. \quad (15)$$

In the above formula, i is the amount of pollutants produced, I is the amount of pollutants removed, T_i is the amount of pollutants discharged, and C_A is the unit actual treatment cost of the fifth pollutant.

It is not difficult to see from the above cost accounting index system that the cost function is an important node to calculate the cost of pollutant treatment. Mathematical model is a new subject developed in recent years, which is a science combining mathematical theory with practical problems. It sums up the practical problems into corresponding mathematical problems and makes in-depth analysis and research on the basis of mathematical concepts, methods, and theories, so as to describe the actual problems from the qualitative or quantitative perspective and provide accurate numbers for solving practical problems according to reliable guidance. Discrete probability model is also a complex advanced multivariate statistical analysis technique for dealing with discrete, nonlinear qualitative data. In order to optimize the cost function, we need to use the discrete probability model to optimize two main statistical datasets: one is the total environmental loads (EL) data of the governance cycle, and the other is the average unit environmental cost (UEC) of the governance cycle. EL can be obtained from inventory analysis (IA) of UEC. The specific calculation formula of unit cost UEC_i of ecological environment load is as follows:

$$UEC_i = \frac{UEC_{\max} + 2UEC_a + 2UEC_m + UEC_{\min}}{2}. \quad (16)$$

In the above formula, $UEC_{\max}$ is the maximum unit cost of ecological environment load, $UEC_{\min}$ is the minimum unit cost of ecological environment load, UEC_a is the

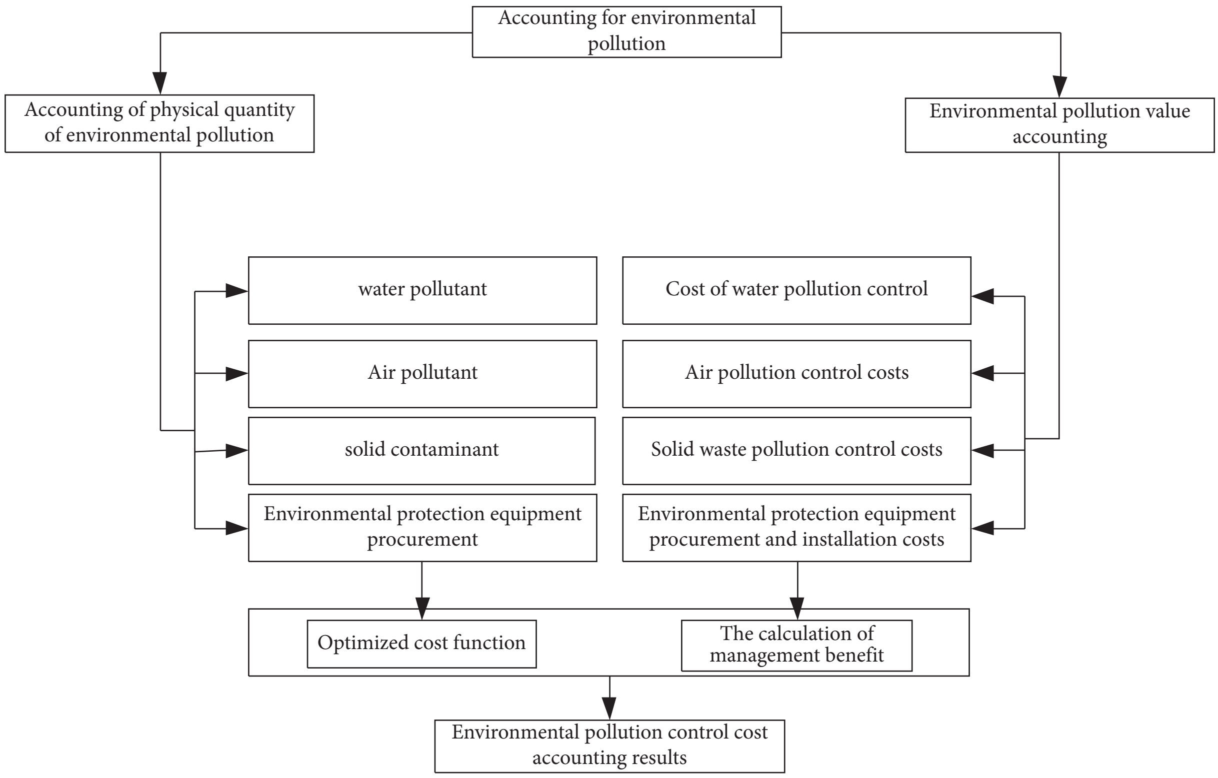

Figure 1: Cost accounting algorithm architecture of ecological environment pollution control.

average unit cost of ecological environment load, and UEC_m is the middle value of unit cost of ecological environment load.

The cost function $\cos t(a_1)$ optimized by discrete probability model can be expressed by the following formula:

$$\cos t(a_1) = K \times u\left(\sum_{i=1}^{n} E_{ij} \times UEC_i\right). \quad (17)$$

In the above formula, K is the cost value coefficient, u is the discrete probability, E_{ij} is the ecological environment load, and j are the various stages of inventory analysis. Using discrete probability model cost function for optimization can collect and compare the scattered ecological environment data information and improve the accuracy of ecological environmental pollution control cost accounting.

After optimizing the cost function, it is necessary to calculate the treatment benefit of a certain pollution control measure, which is expressed as follows:

$$\eta_i = \frac{T_i \times (I - T_i)}{S_i \times I}. \quad (18)$$

In the above formula, S_i is the maximum allowable emission concentration of the i-th pollutant, and the treatment cost coefficient of the pollutant is calculated:

$$\gamma_i = \frac{i \times \eta_i}{\sum_{i=1}^{n} \eta_i}. \quad (19)$$

In the above formula, γ_i is the treatment cost coefficient of the i-th pollutant, which is the proportion of the total actual treatment cost of waste gas or wastewater.

The treatment cost of a certain ecological environment pollution is as follows:

$$\overline{C} = \frac{C_i \times \gamma \times M_{jk}}{T_i}. \quad (20)$$

According to the above analysis, the cost accounting algorithm of ecological environmental pollution control is designed, and its architecture is shown in Figure 1.

The classification of environmental pollution costs is shown in Table 2.

3. Experiment Design and Result Analysis

In order to verify the practical application effect of the environmental pollution control cost accounting algorithm based on discrete probability, experimental test is needed. The experimental hardware device is a 64G solid-state hard disk, 16G cache, 8-core high-speed processor computer. SQL 2018 database and MATLAB 7.2 software are set inside the computer to improve the operation speed and ensure the scientific reliability of the experiment. This experiment sample data comes from the local ecological environment information platform, and all the data in the platform are taken as the experimental sample data. The cost accounting algorithm of environmental pollution control based on activity-based costing in [4], the cost accounting algorithm based on multiattribute analysis in [5], and the cost accounting algorithm for environmental pollution control

Table 2: Classification of environmental pollution costs.

Type	Specific project
The cost of disposing of pollutants	Recyclable pollutants Nonrecyclable pollutants
The cost of improving the environmental quality of enterprises	Road dust pollution prevention and control Rinsing and cleaning strength Putting an end to burn
The cost of emitting waste gas and water	Exhaust emission cost Wastewater discharge cost
The cost of developing environmentally friendly products	Prevention during production Using the process of processing
The cost of conducting environmental audits and monitoring	Cost of environmental audit Environmental monitoring cost

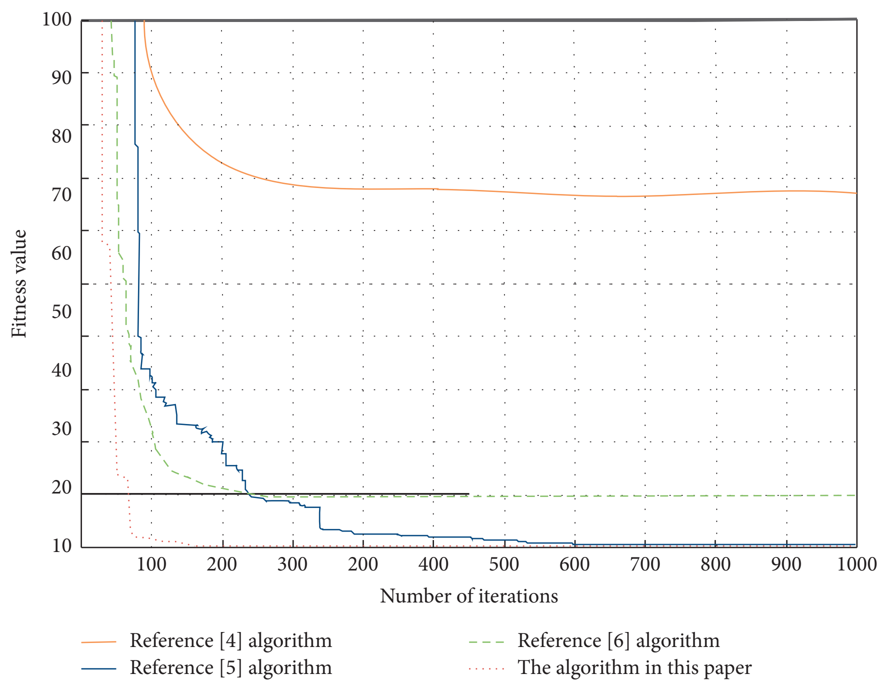

Figure 2: Comparison of convergence of algorithms.

based on BP neural network in [6] are selected as experimental comparative algorithms. The performance of the methods is tested by comparing the cost accounting indicators of different algorithms.

3.1. Comparison of Convergence of Algorithms. Firstly, the convergence of the four algorithms is compared, and the results are shown in Figure 2.

It can be seen from Figure 2 that the convergence of the algorithm in this paper is better than that of the comparison algorithm in the literature. The main reason is that the algorithm can quickly converge to the optimal within 70 iterations, and the shape of the convergence curve is close to the vertical downward, and there is almost no inflection point, so it has good convergence [43].

3.2. Accounting Error Rate. The algorithms in [4], [5], and [6] and the algorithm in this paper are used to carry out experiments, and the comparison results of the four algorithms are shown in Figure 3.

Analysis of Figure 3 shows that the accounting error rate of the algorithm in [4] is between -10.4% and 4.9%, that of the algorithm in [5] is between -10.3% and 5.2%, that of the algorithm in [6] is between -10.3% and 5.1%, and that of the algorithm in this paper is between -0.2% and 1.3%. Overall, the calculation error rate of this algorithm is the lowest, so the algorithm can accurately calculate the cost of ecological environmental pollution control.

3.3. Comparison of Accounting Time. Based on the above experiments, the calculation time of the four algorithms is further compared, and the results are shown in Figure 4.

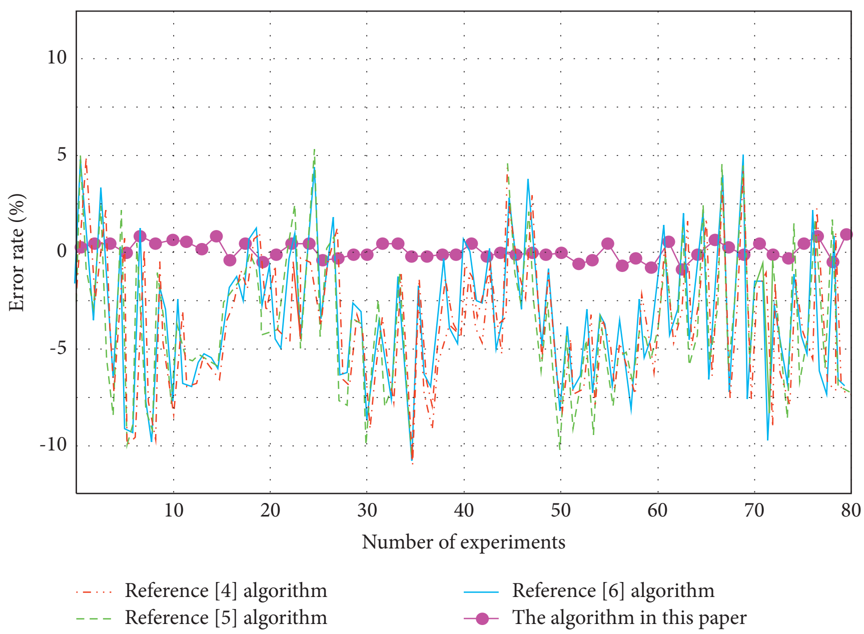

FIGURE 3: Calculation error rate.

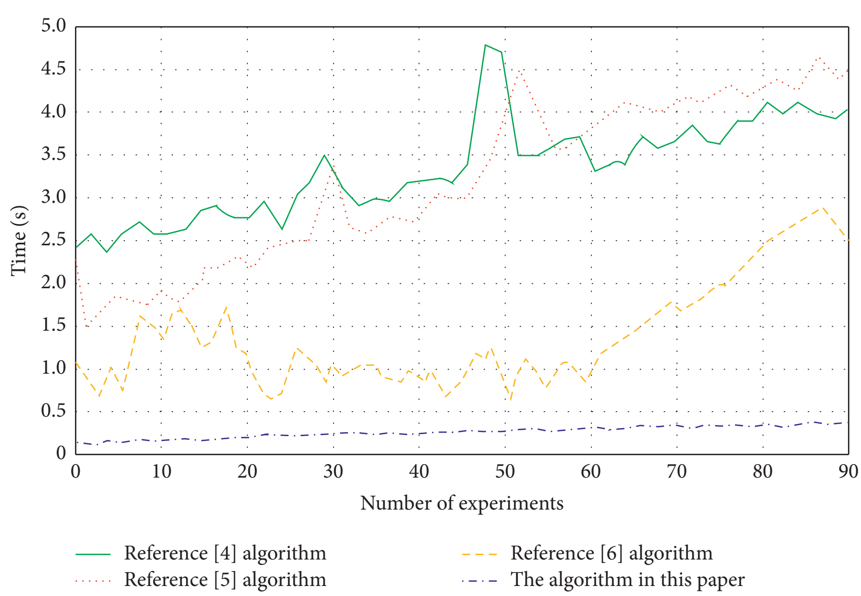

FIGURE 4: Accounting time.

It can be seen from Figure 4 that the accounting time range of the algorithm in [4] is 2.4 s–4.6 s, and the accounting time is the highest among the four algorithms. The calculation time range of [5] algorithm is 1.5 s–4.5 s, and the accounting time range of [6] algorithm is 1.3 s–3.7 s, while the accounting time of this algorithm is always less than 0.4 s, which is the lowest among the four algorithms, which shows that the algorithm can quickly calculate the ecological environmental pollution treatment cost [44].

4. Conclusion

Although the rapid development of industry has a certain role in promoting social economy, a series of ecological and environmental pollution problems have also followed, and the community began to pay more attention to environmental problems, so this paper proposes a discrete probability-based environmental pollution control cost calculation algorithm, and the effectiveness of the algorithm is verified by experiments. In the next step, the algorithm can be applied in practice to make a comprehensive and detailed cost accounting strategy for environmental pollution control, so as to provide technical basis for comprehensive decision-making of environmental pollution control.

As the current energy consumption structure is unreasonable, which poses a great threat to the environment, in the process of social and economic development in the future, attention should be paid to optimizing the energy structure, reducing the proportion of high pollution energy consumption, and actively developing new energy technologies represented by nuclear energy, solar energy, wind energy, and biogas. We should strengthen the monitoring of key pollution industries and key pollution areas, increase pollution control efforts, strictly control the amount of pollutants discharged, and impose heavy taxes on enterprises that discharge pollutants beyond the standard. At the same time, we should pay attention to the development of circular economy and promote the recycling of waste resources, so as to reduce environmental pollution and realize the sustainable development of social economy.

Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest

It is declared by the authors that there are no conflicts of interest regarding the publication of this article.

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