

Research on Integrated Automatic Control of Electrical Engineering Based on Multi-objective Ant Colony Algorithm

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Abstract: In our country electrical engineering automation, mainly invests in the control system to adopt the scientific advanced technical means, is uses the intelligence to imitate "the person" will have the language movement and the thinking way, through this kind of high-tech means achieves to replace the artificial to adopt the intelligent optimized control technology to the operating system. The application of intelligent technology can make the quality level of automatic control of electrical engineering more advanced and efficient. Therefore, this paper mainly focuses on the multi-objective ant colony algorithm based on the comprehensive automatic control of electrical engineering research and discussion, so as to prove that the use of intelligent technology in the realization of automatic control of electrical engineering can play an important role effectively, hope this research can bring some help to the field of electrical engineering control. Electrical engineering automation, in fact, is to use advanced scientific and technological means in the control system to simulate artificial ideas, actions, so as to replace manual to optimize the operating system and intelligent control. The integration of intelligent technology makes the level of automatic control of electrical engineering more and more perfect. Based on this, this paper mainly introduces the basic characteristics and concrete application of electrical engineering construction, and further explains the positive role of multi-objective ant colony algorithm in the realization of automatic control in electrical engineering.

1. Foreword

The multi-target ant colony algorithm is a technology that imitates human behavior and thinking mode. The content of intelligent technology includes basic abilities such as imitation ability, learning ability, adaptability and organization ability, which can be used to analyze the data that the power inspection equipment needs to collect. Finally, the real-time adjustment response of power system is made. This kind of intelligent technology combines the advantages of computer science, automation science and bionics, and its application in power system can completely replace manual work in some way, especially when many need to be calculated, it can be more accurate and faster than the data calculated manually. He can take advantage of many people who don't work well, especially at a convenient and fast rate of dealing with hundreds of thousands of large data, which is the speed that manual processing can not catch up with, and that is, in certain more dangerous situations, artificial may be at risk, but this intelligent technology can replace artificial protection from danger. increased the safety rate of manual work. Because all walks of life in the society are inseparable from the use of electric power energy, so the demand for electric power energy is also increasing day by day, but the problem of hidden safety problems is becoming more and more prominent, so now the requirements for equipment maintenance work in the electric power industry are becoming higher and higher. At present, the most serious problem in the maintenance of electric power equipment is the problem of automatic control. Because there are many hidden dangers and dangerous factors in the construction site, and the environment of the maintenance site may be relatively bad, the safety and security of the maintenance personnel is a great problem.



Figure 1 Multi-objective ant colony algorithm

2. Problems in Integrated Automatic Control of Electrical Engineering

2.1. Inadequate Automation Controls

All safety accidents in the process of automatic control should be analyzed and studied carefully to find out the root cause. However, most of the reasons are that the safety measures in the maintenance construction site are not fully implemented, and most of the safety management measures in the power equipment maintenance construction are not in place, in fact, the construction site management personnel pay less attention to the power equipment maintenance work. Moreover, it is not correct that some safety managers have insufficient understanding of the actual situation of the electric power equipment maintenance construction site and only rely on their own past experience to deal with it, and this series of problems has contributed to the major safety risks.

2.2. Management Mechanisms

In the maintenance of electric power equipment, the safety problem has always been the most important topic, whether has the safety consciousness is the fundamental embodiment of measuring the professional quality of an electric power equipment maintenance personnel. It is also very important whether the safety responsibility consciousness and technical level of maintenance personnel can match the maintenance standard of electrical equipment, both of which will affect the maintenance level of electrical equipment. Safety problems occur during maintenance, usually because the professional quality of maintenance personnel is not high enough to understand the relevant structure of power equipment. There is also maintenance personnel maintenance experience is not enough, there is still a temporary post after the phenomenon, temporary duty maintenance personnel are mostly not trained in safety, so there is not enough awareness of safety[1]The key factors that can be directly related to the safety problems of maintenance personnel are whether the professional technology is not excellent or the safety consciousness is not high enough, so in these two aspects, the relevant units that manage the maintenance and repair construction of electric power equipment need to strengthen the preventive education.



Figure 2 Multi-objective ant colony algorithm

3. Application of Intelligent Technology in Automation Control of Electrical Engineering

3.1. Application of Fuzzy Control Intelligent Technology

The operation of fuzzy control intelligent technology is relatively simple, at present, it is mainly used in the module of electrical operation, and fuzzy control intelligent technology is to use fuzzy model to master the state of electrical engineering operation. When using this technology to control the system, we must first construct the fuzzy model of the controlled electrical system, and then use the model to control the operation. The advantage of applying this technology is that it not only embodies the characteristics of intelligent technology, but also makes the operation process and distribution mode of system automation more clear. In the electrical part, he can also achieve the intelligent allocation of power resources according to the different power, and further optimize the allocation of resources.

3.2. Linear Optimal Control

The main advantages of linear optimal control are obvious in local linear models, while the control effect in other model systems is often not very ideal. Optimal excitation control principle is to maintain the linear optimal scheme, which is to compare the voltage value of generator measured voltage and the voltage value of the given point voltage, and use the PID method to calculate the deviation accurately to realize the strict control of the voltage[2]. It regulates the control voltage by adjusting the transfer angle of the voltage phase to ensure the intelligent operation of the control voltage to the output voltage conversion.



Figure 3 Multi-objective ant colony algorithm

3.3. Application of Integrated Intelligent Systems Technology

Integrated intelligent system is processed by modern control and intelligent control. Cross utilization of different control and adaptive fuzzy organization control is a common control method

of integrated intelligent system, which is usually used in the complex situation of electrical engineering. The application of expert system control, linear optimal control, fuzzy control and neural network control technology is suitable for the application of integrated intelligent control technology[3]The integrated intelligent control system has great advantages in the operation of electrical engineering, so that the effective integration of modern control system and intelligent control system can play the greatest value and role.

3.4. Application of Intelligent Detection Technology

In all walks of life in our country, the electric power industry is a kind of high-risk industry, the staff of the electric power industry is dealing with high-voltage power, a little carelessness, it is possible to face accidents or even life risks, once the electric power operators have a safety accident, the consequences are very serious. Therefore, the use of intelligent detection technology in the power system is of great help to modern power workers, it can not only monitor the equipment in the power system, there are any small problems inside the power equipment, it can also accurately detect, can help the system to eliminate all missing security risks, after testing will directly reflect the detection data to the inspectors, the inspectors can solve the detected problems in time and effectively through the test report, to a certain extent can avoid a lot of security problems.

4. Conclusion

With the continuous improvement of our national economy, the construction unit is paying more and more attention to the safety problems in the construction process. In the field of electric power, although the development of electric power industry is also rising steadily, there are still a lot of hidden safety problems in management, which will not only affect the efficiency and quality of maintenance, but also threaten the personal safety of maintenance personnel. Therefore, the comprehensive automation control of electrical engineering should be optimized in time, so as to further promote the development of electric power industry. In general, a large number of domestic electrical automation equipment operating systems have been widely used in artificial intelligence advanced technology, the most basic system control methods are mainly fuzzy control, expert system, neural network control and other applications, and then effectively promote the development of electrical engineering automation historical process, and with the future industry technology innovation, their technical relationship is bound to be closer in the future, so it provides a favorable guarantee for the application of intelligent technology in electrical engineering automation, so that the relevant technology applications will be more extensive[4]advanced technology has been put into most of our electrical automation equipment, this advanced scientific intelligent technology can effectively promote the rapid development of power system automation in our country, and can be accompanied by continuous innovation and development in the field of electrical automation control, in the process, these technologies can be well applied to development in the future, and the relationship will become closer. Therefore, the application of intelligent technology occupies an important core position in the automation of power system, at the same time, it also takes a big step in the field of science and technology automation in our country, which makes the new industry of electric science and technology industry in our country further develop and expand the scope of application of related science and technology.

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