

Analysis on current situation and development of electromechanical control technology

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Keywords: Mechanical and electrical control; current situation; development direction

Abstract: Electromechanical control technology is the core technology of mechatronics, and the level of water products marks the development level of mechatronics. At present, in the application field of mechatronics, technicians usually use mechatronics control to meet the requirements of safe and stable operation of Mechatronics system. In order to ensure the stability of the function of Mechatronics in all fields of society, create more wealth for society and promote the development of society and economy, it is necessary to make deep analysis and Research on the electromechanical control technology. This paper makes a detailed analysis and exposition of the current situation of electromechanical control technology and the basic requirements of electromechanical control technology, and looks forward to the future development direction of mechatronics control technology.

1. Introduction

With the development of society and the progress of science, the pursuit of human beings has become more and more avant-garde with the progress of the society, and the pursuit is motivated. Therefore, in the active participation of the masses, we have ushered in a milestone in science and technology - the emergence of mechatronics. The emergence of this mechanical and electrical integration shocked the society, everyone has issued unprecedented passion, with the joint efforts of everyone, mechanical and electrical control technology has come out. This is a project of collecting machines and electricity. With the more mature development of the electromechanical control technology, we have a better master of technology, which will bring us a better and more convenient living environment.

2. The development history of mechanical and electrical control technology

In this era of mechanical and electrical integration, mechanical and electrical control system has been seen everywhere, it has been widely used, people know its benefits, understand its current role, and more like it to bring people's convenience, fast. But how much do we know about them? People just pay attention to the advantages of the present and ignore the background of the past. When the electricity was invented, people at that time thought that it was the most magical thing, and there would be no more magical things than electricity, which created a problem in the minds of people, that people would be in a state of sleep without the attraction of better things, not trying to pursue anything else. . This state has been for a long time. People have come out of the novelty brought by electricity. It has been found that electricity is the same. There is nothing special. Without the attraction of novelty, people begin to sober up from the state of sleep and carry on a new study in order to have more novelty. Some experts began to carry out a deeper study and have professional cooperation. After a long period of experiment and practice, experts have come up with the project. However, it was a kind of guess, lack of practical experience, so they started to act. After a thorough investigation of foreign countries, they understood the high-tech products of foreign countries, and after a series of experiments, the earliest electromechanical combination was born. Because the mechatronics has been found to have great benefits to human beings and its potential is still great, people have studied it more deeply and invested more human and material resources. Today, we can see the strong emergence of mechanical and electrical control systems and a very wide range of

infiltration, which fully reflects the benefits of mechanical and electrical integration. We will eventually make our country faster and more prosperous because of the mechanical and electrical control technology, and make our life more colorful, comfortable and convenient.

3. General situation of mechanical and electrical control technology

3.1 concept of mechanical and electrical control technology

Electromechanical control technology refers to the integrated technology of combining electronics and machinery with modern electronic and mechanical knowledge. Electromechanical technology and control technology are the core components of the electromechanical control technology system. The two technologies involve many fields, including precision machinery, computer, automatic control, servo drive, fluid rotation, detection sensing, information processing, network transmission and so on. The main purpose of Mechatronics in Mechatronics is to design a better control system and control parts, and then complete the control and management of the whole mechatronics system through a functional and stable control system and a scientific control program, and raise the efficiency. The mechanical and electrical system has many procedures and integrity, so many subroutines are difficult to handle accurately. In the course of the system operation, once a component fails, it will affect the operation of the whole system. In serious case, the whole system can be paralyzed, unable to work and cause serious economic loss to the mechatronics application enterprise. In order to ensure the safety and stability of the mechanical and electrical system, the sustainable transportation of the system will be guaranteed. Yes, it is necessary to control the mechanical and electrical system.

3.2 basic requirements of electromechanical control system

There are many kinds of electromechanical control systems, various kinds of mechanical and electrical control systems are various, and various systems are of great difference. So in the control of mechanical and electrical systems, the requirements are different. In a large number of electromechanical control systems, although the parameters of each system are different and the value of data changes can not be determined, the basic requirements for the amount of control proposed in the operation of various systems are consistent, and their specific requirements are stability, accuracy and speediness, and the stability and accuracy of the system are the whole system. The basic and most important requirement of the operation is that only the system meets the requirements of stability and accuracy, can we query the information and data of the change in time, and then optimize the system according to the amount of data change, improve the control ability of the system, ensure the efficient and stable operation of the system; however, single It is not enough to realize the efficient operation of Mechatronics by the stability and accuracy of the system. It also needs to request the running speed of the system, not only to ensure the stability and accuracy of the system operation, but also to improve the running speed of the system, and how to improve the stability, accuracy and speed of the operation of the mechatronics control system. To achieve coordination, unity and efficient operation is a technical problem that we need to pay attention to. The difference is large. So in the control of mechanical and electrical systems, the requirements are different. In a large number of electromechanical control systems, although the parameters of each system are different and the value of data changes can not be determined, the basic requirements for the amount of control proposed in the operation of various systems are consistent, and their specific requirements are stability, accuracy and speediness, and the stability and accuracy of the system are the whole system. The basic and most important requirement of the operation is that only the system meets the requirements of stability and accuracy, can we query the information and data of the change in time, and then optimize the system according to the amount of data change, improve the control ability of the system, ensure the efficient and stable operation of the system; however, single It is not enough to realize the efficient operation of Mechatronics by the stability and accuracy of the system. It also needs to request the running speed of the system, not only to ensure the stability and accuracy of the system operation, but also to improve the running speed of the

system, and how to improve the stability, accuracy and speed of the operation of the mechatronics control system. To achieve coordination, unity and efficient operation is a technical problem that we need to pay attention to.

4. Present situation and development of mechatronics control technology

In the 30s of last century, based on the level of scientific and technological development, the research and development of mechanical and electrical control technology had not been carried out, and the mechanical and electrical control technology had not been applied in many fields of society. For example, machinery, manufacturing, processing and so on. In the field of machinery and manufacturing, the operation of mechanical equipment is accomplished by manual operation. It is difficult to operate in the process of production, and the precision is high. The ability of the process only depends on the ability of human being. In addition, personnel technical factors often finish the whole operation process, which takes more time and the quality of products is bigger. In the 40s of the last century, with the development of science and technology and the further deepening of the demand for modern machinery in the social production, the scientists concerned with the research of mechanical and electrical control have created the classical control theory after a long period of perseverance and study. This theory lays a foundation for the theoretical Research of electromechanical control in the future. A solid foundation is set. The classical control theory has gradually developed the fixed value control system through the research and analysis of many scientists. The system has the characteristics of single input and output. It mainly analyzes and studies the system data by using large size base instruments and other manipulations. In the middle of the last century, the mechatronics control technology has been further developed, breaking through the limitation of the area and scope of the traditional electromechanical control system, realizing the transformation of the electromechanical control from the local control to the centralized supervision and control, and the realization of the electromechanical control function is mainly by using the pneumatic, electric unit combined instrument and circuit inspection. The opening of the measuring device. By the 60s, the development of science and technology has been further developed, and the research of electromechanical control technology has made new achievements. The new control technology is developed to solve the complex system with the electric combination unit instrument. With the development of science and technology, the emergence and use of Internet technology in 70s has greatly promoted the electronic control. The system is gradually developing to the direction of intelligence and miniaturization. With the development of the society and economy and the continuous progress of science and technology, the electromechanical control system will develop into the direction of integration, intelligence and scale.

5. Development direction of electromechanical control

5.1 strengthen PID control

PID refers to proportional control unit, integral control unit and differential control unit. The main function is to control and correct the current value, past value and future value of the controlled quantity. As far as the current PID control structure is concerned, the system operation is relatively simple in the process of application, but the existing problem is that it is difficult to effectively solve and deal with the constraints between the stability and rapidity of the system, and become the bottleneck of the development of the PID control system, and further research is needed.

5.2 improvement of adaptive control management

Self-adaptive control theory includes self-tuning control and model reference adaptive control. Although the current adaptive system is widely used in the field of mechatronics, the system is simple and manipulative in the process of application, but the whole system has more funds to invest in the process of operation. Once there are problems in the operation of the system, it will

cause serious economic losses. In addition, model reference adaptive control system is more difficult in reference model selection. Therefore, when the adaptive control system is optimized, the research on the self-adaptive law with simple algorithm and strong robustness is the key object to improve the adaptive control.

5.3 The development direction of fuzzy control system

The fuzzy controller is mainly composed of fuzzification, fuzzy algorithm and fuzzy. The fuzzy controller passes through the controlled object and then passes through the sensor, and finally realizes the management control. Compared with adaptive control, fuzzy control has strong applicability, robustness and fault tolerance. But fuzzy control also has some shortcomings, based on the control system itself program is relatively simple, difficult to achieve good control effect for difficult processes. In addition, the application process of fuzzy control system is greatly influenced by the uncertain factors, especially the greatest influence of human factors. It is necessary to strengthen the training of the professional quality and ability of the operators of fuzzy control system.

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