Thoughts on the Construction of Power System Based on Computer Simulation Technology

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Abstract. In the power system, experiment is one of the most critical components. In the past experimental work, because of the inability to master the equipment, limited hands-on ability, lack of experimental steps and experimental ideas, many experiments could not be successfully completed, electronic and electrical experiments are the key to relevant personnel to improve their practical ability way. If it is a mistake in the experiment, it will cause damage to the equipment and it will also endanger the safety of the experimenters. Therefore, the use of simulation technology in experiments is of great significance. Therefore, it is of practical significance to analyze the electronic and electrical experiment simulation technology.

Keywords: Computer, Simulation, Power System

1. Introduction

With the continuous development of modern science and technology, more and more industries have begun to introduce technology, especially in the electrical field. The application of circuit simulation technology in classroom teaching can solve many problems in electronic and electrical engineering. This article mainly analyzes the practical application of circuit simulation, explains the results obtained therein and promotes the development of circuit simulation.

2. Computer simulation technology analysis

The simulation technology is used in electronic and electrical experiments and the simulation equipment and components can be used. These equipment, instruments and components are hardly affected by the external environment, which effectively improves the feasibility of the experiment and further improves the efficiency of the electrical and electronic experiments[1]. Through the use of simulation technology, the simulation of the experimental process can turn some conceptual knowledge in the experiment into direct. After the actual image is presented, it can make a direct
impression in people's minds and make them feel more Really, this provides great convenience for people's inquiry and analysis. In addition, the use of simulation technology in electronic and electrical experiments does not need to be the same as the actual operation and does not need to do related work such as component installation and welding. In this mode, there will be no risk due to operational errors. To ensure the safety of the experiment[2], Current and voltage are often used in the development of experimental work and the application of these current and voltage will pose a certain threat to the safety of laboratory personnel. For example, when the experimenter is connected to the current, the problem of incorrect connection position will cause a short circuit in the line, resulting in a fire, which is extremely harmful to the experimenter. At the same time, if the experimenter has irregular behavior in the operation, it will affect the performance of the experimental equipment. For example, when performing logic circuit experiment operations, if the chip is not installed correctly, the chip will be damaged, which may result in the loss of circuit experiment data. In severe cases, it will affect the normal operation of the device and even endanger personal safety. After the application of simulation technology and computer EWB software simulation of electrical and electrical experiments, the experiment is carried out in computer virtual software, so as to avoid equipment damage caused by operational errors and also protect the personal safety of laboratory personnel. The power simulation mode is shown in the figure 1.

![Figure 1. Power simulation mode](image)

3. Analysis of actual problems in power system

3.1. Reasonable reduction of resistance

In order to further improve the system operation effect and ensure that the grounding treatment conforms to the standard, the value of the grounding resistance must be centrally controlled. First, the entire system should be processed by external grounding. The main grounding grid area should connect the main transformer system and the grounding device with low resistivity to reduce the grounding resistance and optimize the grounding effect. There are many restrictions on the processing mechanism, which requires a comprehensive analysis by technical personnel[3]. Second, to effectively expand the area of the grounding grid. If conditions permit, we must ensure that the area of the
grounding grid is effectively increased and the resistance value is reduced. Third, increase the buried depth of the grounding grid.

3.2. Rational integration of grounding system

In the process of grounding system management, we must pay full attention to the system operation structure and control system, especially to integrate the three major grounding systems. Among them, IT system and TN system cannot be installed at the same time. There are three basic methods for the operation of the TN system and the relevant scope of application is not consistent. Different situations must be handled in a centralized manner. First, in the application process of the TN-C-S system, the power supply level and quality requirements of this power system are high. It is necessary to ensure stable safety performance before applying the system, so as to effectively play the actual value of the grounding system. Second, the TN-C system, in the process of actual line operation and management, the system has no more cumbersome requirements for the line, which can simplify the line and improve safety. There are very few explosion problems. Therefore, in areas where the working environment is relatively simple The application of this system is relatively common.

3.3. Rationalized control of surge protectors

In the process of actual equipment processing and management, the surge protector should be integrated, the length of the ground wire should be set to the shortest and straightest and extending the length of the ground wire can effectively increase the impedance value\(^4\). Ensure that the high-frequency instantaneous voltage and the total impedance of the resonance can form an effective open circuit structure to ensure the overall effect of the equipment and operating system. In addition, in the process of applying surge protectors, comprehensive shielding of cables with shielding protection devices is also required to ensure that the treatment effect is as expected. In addition, the technical heat source needs to carry out in-depth treatment of the quality of the ground wire. The use of double stranded wire requires the design process and design requirements to meet the basic standards of the material and effectively avoid the use of single-strand copper wire, improve quality and improve at the same time. The design effect and application level promote the optimized operation of the entire grounding system.

4. Construction of power system simulation module

The simulation technology is used in the experiment and the experimental circuit can be analyzed through software. The first is to send the circuit information to be tested to the virtual laboratory and input the component data. When inputting component data, it is necessary to design the parameters before input and use simulation software to analyze the static and dynamic characteristics of the circuit and also analyze the transmission characteristics and logical relationships. After analysis, enter or print according to relevant requirements\(^5\). Among them, use communication, cooperation dialogue or exchange practice to clarify the parameter value of the best working state of the circuit and then output or print according to the demand after clarification. For example, in the actual experimental operation process, you can use the parameters of the previous design experiment as a reference, compare the computer output and circuit measurement and summarize the inconsistencies between the two. After adjusting the parameters, use the software to do the analysis. In the implementation process of this model, it is mainly a process from simulation to actual and then from actual results to simulated results.
In this process, it is necessary to deeply understand the knowledge of the principle of electronic circuits, which is of crucial significance for the cultivation of laboratory personnel's analytical ability and problem-handling ability\(^6\). Through the use of simulation technology, theoretical knowledge and practice can be combined to make the understanding and mastering of knowledge more systematic. The actual building model is shown as figure 2.

![Actual building model](image)

**Figure 2.** Actual building model

### 5. Conclusion

At the same time, the virtual electronics laboratory can not only do digital, hybrid and analog circuit simulation, but also analyze circuit performance. When implementing the analysis method, it is necessary to effectively use the Internet of Things technology and establish a component library model. After designing the circuit diagram, turn on the power again, read out the parameters in the power supply in the oscilloscope, use the surveying instrument to detect and analyze the tested data of the circuit and finally compare with the theoretical result after outputting the result. If there is a big difference between the simulation results and the actual results, input parameters to adjust, modify the data and output the results again, so as to repeat many times to ensure the accuracy and objectivity of the experimental results.

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