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Research on the Combination of MATLAB and AutoCAD

Dongyang Zhang[1, a], Tai Yin[1, b]

[1]School of Control and Computer Engineering, North China Electric Power University, BaoDing 071000, China.

[a] backyla@qq.com, [b]1332826626@qq.com

Abstract

Since its emergence, simulation technology has gradually become one of the means for people to learn and explore the world. Until now simulation technology is still in the continuous development and improvement, is slowly form a complete scientific system, simulation application fields are also growing, from industrial production to your daily life constantly infiltration, which under the background of computer simulation technology in the Internet age is of great significance to the development of simulation, this article will revolve around the computer simulation technology in recent years, aiming to show the development of computer simulation modeling, and computer simulation applications.

Keywords

Computer simulation technology, Simulation modeling, Computer simulation application.

1. Introduction

Computer simulation technology is a branch of simulation technology. Simulation technology is a simulation model technology that applies simulation hardware and software to carry out simulation experiments, and reflects the system behavior or process by means of some numerical calculations and problem solving. The emergence of simulation technology can be traced back to the early 20th century. In the 1940s and 1950s, the development of aviation, aerospace and atomic energy technology promoted the progress of simulation technology. In the 1960s, the rapid development of computer technology provided advanced simulation tools. The high-speed computing power of computers made the simulation easier and accelerated the development of simulation technology. It was during this period that computer simulation technology began to emerge in the field of simulation. At present, computer simulation technology has been widely applied in the fields of machinery manufacturing, aerospace, transportation, ship engineering, economic management, engineering construction, military simulation and medical care [1]. With the development in recent decades, computer simulation technology has become a complete and normative discipline system.

1.1 Simulation system hierarchy

As the application of simulation becomes more and more complicated, a more rigorous process is needed to realize the application simulation. Therefore, the hierarchy of simulation system architecture is gradually formed in the development of simulation. The simulation process is gradually fixed and presented in the form of four basic layers [2], that is, the resource layer, which provides various standardized data required for simulation application, namely various parameters required for modeling, and also contains various information for simulation application management. Support environment layer, including modeling support environment and operation support environment, such as computer simulation environment, connection interface of various servers,

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physical interface of sensors, etc. The simulation model layer includes the design and implementation of various simulation models required to complete the simulation application; The analysis and evaluation layer analyzes and evaluates the simulation process and results, verifies the simulation results, and determines whether the model is correct, whether the simulation conforms to the scientific analysis, and whether the simulation needs to be re-simulated.The hierarchy of simulation system architecture is beneficial to simulation design and development, and greatly improves the openness, expansibility and manageability of simulation system. The hierarchy of simulation system is the basic requirement of simulation system development.

1.2 The computer simulation system is networked

At present, we have fully entered the network information era, computer network has become an important foundation of information society, it will also become an important underlying foundation of computer simulation system in the future, computer simulation system networking has become an irreversible trend, computer simulation will and is entering the network development road. Using the Internet to provide vast interconnectedness, can significantly reduce the simulation application and simulation application, the simulation application and simulation environment interact between operating costs, such as before without the Internet, the simulation depends on the physical lines of heavy and complicated environment and application of interconnection, and now with the help of a network can save these complex circuit, thus reducing costs, in addition network convenience also make the simulation development process is more rapid and practical in use.The network of computer simulation makes the simulation system change not only in the physical structure of simulation, but also in the development mode. The network makes it possible for different development teams to jointly develop the simulation system. Nowadays, network pursuit of information security and privacy perfectly meets the requirements of network development of simulation system. Meanwhile, the development of 5G and other network technologies will provide a more reliable, effective and rapid development and operation environment for simulation system. All this makes the network development of computer simulation system faster.And the simulation system to achieve the same level, the implementation of computer simulation system networking also has immeasurable benefits. To realize the network of simulation system, the development team can not only avoid repeated development to save social resources to a certain extent, but also compensate part of the development cost through appropriate fees.

1.3 Computer simulation synergy

The coordination of computer simulation system actually refers to the cooperation between human and computer. For any of the more complex computer simulation tasks, it is not a machine, a person can complete the work. How to coordinate the work between people and different machines has always been the focus of computer simulation.Along with the development of computer simulation in recent years, co-ordinated has become the current computer simulation system is an important feature, co-ordinated problems both in the long distance to participate in the simulation of personnel and equipment in the simulation of virtual and network environment, through to cooperate to complete the necessary tasks to each other, and includes the simulation system of the whole life cycle of development work of all kinds of personnel needed to work together. Synergy is an important guarantee for the development and application of the next generation of simulation systems.Co-ordinated development will realize interpersonal coordination in the process of simulation products, technology and technical coordination, business and business synergy, by integrating all kinds of development tools and data interface between the tool and associated products simulation project of business, technology, processes, data and knowledge system on the key objects such as the effective management. At the same time, collaborative simulation can reduce the difficulty of simulation by encapsulating knowledge, enabling more and more people to master simulation technology, and enabling novices to enter the state of high productivity earlier [1]. In this way, simulation is no longer a "black hole", but enables everyone to enter all the links of the product life cycle, so that more people are willing to participate in the simulation process.

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2. Development of simulation modeling

In the process of computer simulation, the emulator establishes the mathematical model of the system according to the parameters of the system, converts the mathematical model into the simulation calculation model, and achieves the purpose of system operation through the operation of the simulation model [2]. Therefore, the establishment of models (whether mathematical models or computer models) for computer simulation is an important work.

2.1 Requirements and methods of computer simulation modeling

The rapid development of science and technology puts forward strict requirements on the simulation, in order to implement the simulation system is reasonable and stable, the requirement of modeling method is becoming more and more clear, at present the main requirements of the model include the following:

(1) the simulation accuracy and reliability of demand is higher and higher, need to build the model within a certain range of accuracy;

(2) for the same simulation research object, to reflect different attributes in different simulation systems, specific requirements should be considered during modeling, and methods of simplification, refinement, aggregation and depolymerization of simulation models should be studied;

(3) the emulator should not only consider the requirements of establishing the model in the simulation process, but also consider whether the model conforms to the requirements when the simulation is completed;

(4) the modeling process should reflect the changes in the overall configuration and quality management requirements of the simulation system, establish a complete model file, record and scientifically manage the attributes of the model and its establishment process [2], and so on. No matter how strict the requirements for the modeling process are, they are all in order to comply with the development of computer simulation technology. It is easy to know that the future modeling will only have more and more standardized requirements.

For the process of modeling, three methods are often used to model: white box system, black box system or gray box system. These three methods are applicable to all simulation modeling situations. White box system is to deduce and restore the original system when the current system structure and parameters are clear, which is to use prior knowledge to model. The black-box system is to observe the output data and establish the model through experiment or identification. This method does not allow direct testing of the established model, but USES the induction method of data collection and statistics to verify the reliability of the model.

The gray box system combines the above two methods. Computer simulation technology has developed to the present, has derived many specific modeling methods, but the essence is around these three methods in the development.

2.2 Reusable simulation model

The reusability of the simulation model is that the model of this simulation can be modified and re-applied in the future.In the past modeling process, few considerations were given to whether the simulation model could be applied again in the future, which made it more and more difficult for the simulation model to meet the needs of the simulation application after a period of use, and it had to be redesigned and developed according to the new requirements of the simulation application, which was very unfavorable for the development of more and more simulation applications [2]. And with the development of complex system simulation, the change of simulation requirement is more and more rapid, which makes the reusability of simulation model more and more urgent. In order to realize the reusability of the simulation model, the quadratic applicability and reusability of the model should be considered.Modularization and object-oriented design and implementation are adopted in the simulation model implementation, so that the new simulation application development can partially apply the previous research and development results, to some extent, to reduce the pressure of new

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simulation application development, but this lower level of reusability with a lot of randomness and uncertainty. In order to truly realize the reusability of simulation model, it is necessary to establish corresponding standards for every aspect of model design, implementation, verification and management to ensure the reusability of simulation model. Simulation is a target for different application, the application of target different directly reflected in the simulation model of design and implementation, so as a simulation application developed by imitation model is difficult to really into another intact simulation applications, must seriously consider the reuse of simulation model and the consistency of the results of the simulation of the new application degree, the comparison is the key of the simulation model reuse research needs to solve the problem.

3. The development of computer simulation

3.1 The development of the computer simulation support platform and tools

The development of any technology is inseparable from the development of hardware physical basis, similarly, the development of hardware will most naturally drive the development of technology. It is the rapid development of computer simulation support platform and tools that computer simulation technology has been applied in various fields.The development of computer simulation support platform and tools is rapid and has distinct characteristics[4]:

(1) the computer simulation support platform is becoming more and more specialized and standardized. These support platforms and tools have moved from the development stage based on common programming language to the development stage based on special simulation development support tools and support platform;

(2) the running speed of simulation computers is getting faster and faster, and more and more complex system simulation can be realized with only a few computers and computing tools;

(3) the universal commercial software supporting network simulation is becoming more and more mature;

(4) various auxiliary design software, development and test tool software increasingly support simulation functions;

(5) increasing investment in common simulation tool software research, etc.

3.2 The science of complex systems is increasingly dependent on advances in computer simulation

Many of the objects of study in modern science have increasingly involved very complex systems that, for various reasons, cannot be experimented on in the traditional way. Giant clouds of gas spinning in distant galaxies, for example, can't be tested with real experiments. Suppose the amount of carbon dioxide emitted into the atmosphere were double what it is today. What effect would this have on average global temperatures 50 years from now. The operation of such systems is too important to People's Daily lives, but they cannot be observed by experiments. Therefore, using computer simulation technology to predict the parameters of the simulation system has become the only means to study these phenomena, assumptions or assumptions, and the construction of mathematical models and computer models of these complex systems has become the direction of the efforts of researchers in computer simulation technology.

4. Conclusion

Up to now, computer simulation technology has developed rapidly in terms of concept, simulation method, simulation system structure, and application field, etc. Computer simulation theory based on model theory and similarity theory is constantly adding new contents and constantly blooming in new fields. The future of computer simulation is bright.

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