

Intelligent automated computer systems

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Abstract

Fuzzy logic and neural network methods are currently used to solve problems related to process modeling in the conditions of uncertainty or insufficient input data. Neural networks allow not only to model processes as close as possible to real ones, but also to forecast the values of technical parameters. The reliability of a computer system depends on the right choice of the input parameters and the accuracy of calculations. This work is devoted to the issue of developing the automated computer system, taking into account the dynamics of railway vehicles.

Keywords: computer systems, fuzzy logic, neural networks, intelligent control, forecasting

1 Introduction

These days automated computer systems can find new solutions to complex problems in various fields of science and technology. However, there are many issues to consider when developing new intelligent systems. The hardware components of computer systems can not take into account all set of the factors, but mathematical models must consider possible critical conditions. The use of fuzzy logic and neural networks allows to solve some problems associated with the dynamic systems control in conditions of uncertainty and to increase the precision of the modeling.

These methods are used not only to real-time processing, but also can be applied to forecast parameters such as critical speed.

2 General

The object of research is the accurate determination of the critical speed of railway vehicles in the computer decision support system. There are a number of external factors that affect the stability of the system and the value of the critical speed at a certain point in time [1].

We can define speed and stability as linguistic variables. This is important for the speed of information processing in the computer system and for determination the probability of critical states. We assess the accuracy of the simulation

results by comparing them with the experimental data. The membership functions in the adaptive neural fuzzy inference system (ANFIS) are trained to minimize the difference between the experimental data and the fuzzy simulation results [2].

This work focused on the following issues:

- Conditions of uncertainty and noise (technical and environmental factors)
- Real-time monitoring of the critical speed
- Computer data processing speed
- Research of artificial neural network forecasting model
- Design of fuzzy logic control system.

We need to take these issues into account to develop a reliable automated computer system.

3 Conclusions

Thus, in the development of computer systems, it is important to investigate environmental factors and critical values of the parameters. We should also to take into account the stability of nonlinear system and speed of information processing in computer systems to forecast the critical speed of motion. Fuzzy logic methods and neural networks make it possible to build reliable forecasting models and make decisions that are similar to human behavior in the intelligent automated computer systems.

References

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