

## Automated system control of learning Mathematical model of the learner

Activity-active forms of learning that form the basic skills of experimental research, form the basis of engineering education. Professional education is difficult to imagine without extensive integration into the preparation and control of the level of students' knowledge of computer and information technologies.

From a systemic point a block diagram of the learning process can be represented as a series connection of four subsystems:

- « Carrier of knowledge »;
- «Shaper of knowledge»;
- «Learning Tools»;
- «Student».

All subsystems technologically linked and perform functions that are clear from their names.

Distance learning allows introduce modern educational technology in the educational process. This training system is designed for great independent cognitive activity of the student, which helps to improve skills to find specific information, data analysis, results and systematizing competent, high-quality preparation and presentation of relevant information.

Processes of individualization, intellectualization of traditional training systems and technologies are the hallmark of modern computer technology training.

The basis of distance education has been put such a model of knowledge transfer in which knowledge sources are diverse information resources web as specially prepared training courses and resources that already exist in basic telecommunications environment, such as databases, encyclopedias, reference books, dictionaries and other information sources.

For realization of the student model is necessary to consider a number of temporary and group features of the student action during training.

Furthermore, the model of the student should clearly define the level of study of the subject at every stage.

Figure 1 presents a mathematical description of the model in the form of the transfer function. Student model that meets the proposed requirements, implemented as a series connection of the two units. The first link  $W_1$  describes the process of learning a separate sections of the object, and the second  $W_2$  reflects the accumulated knowledge on the subject at a particular time.

The process of learning a separate sections of the object is described by first-order aperiodic link. Transfer coefficient of the link  $K_i$  can be regarded as student's IQ , which characterizes the potential possibility of the student to master the subject. The reciprocal of the time constant  $T_0$  characterizes how quickly students master the proposed material.

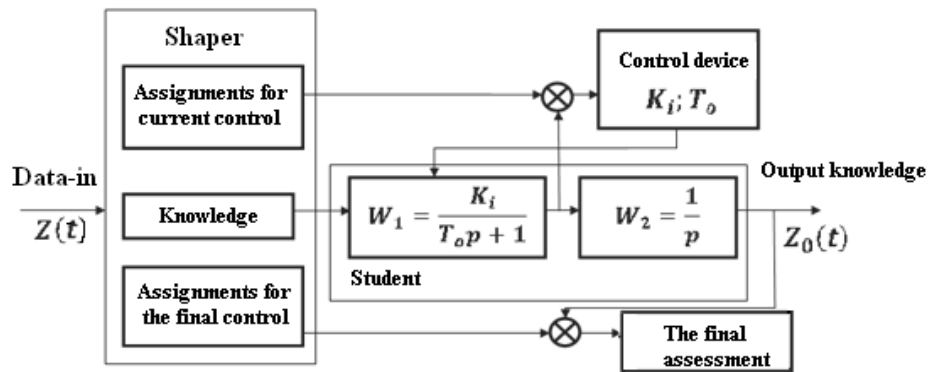


Figure 1- Mathematical model of the student learning in automated engineering disciplines

To determine these parameters of the unit is used information about previous ability of the student to master subjects of similar complexity and volume of the new. For first-year students coefficient  $K_i$  can be determined according to the Unified State Examination (USE). The time constant  $T_o$  depends on the psychophysiological characteristics of the learner and on social factors and the complexity of the material being studied. Furthermore, this value will depend on the time, because as the mastering of the subject knowledge of the conceptual apparatus is improved and culture of its study is generated. Thus, the proposed model of the learner, who perform training using an automated training system is dynamic. It allows not only to analyze the student learning process, but also to predict his training activities given the quality of the learning process other subjects, as well as describe the process of learning in groups.

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