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BASIC PRINCIPLES OF MODELLING THE PROCESS OF PHYSICS TEACHING

The fundamentality of nature laws, which are in the base of physics as a science that objectively reflects reality and physics as a subject that defines its general scientific and general importance. However, the same fundamental determines the complexity of perception the results and achievements of physical science in education. The necessary condition of achievement the positive result of the educational process in physics is its precise planning based on objective factors and subjective factors of this process. Accordingly, as to improve the planning process and to determine the optimal strategy and tactics of the educational process in physics it is appropriate to use analytical tools and computer modeling. This modeling will be successful under conditions of adequate analytical formalization of the actual process of physics teaching.

The modeling of the educational process is not only actual and complex, but also extremely interesting theoretical and applied task, which at different times attracted attention of many researchers and continues to attract attention, because has not a final solution. Successful modeling requires the defining the adequate structure of the educational process. Sufficiently complete and holistic conceptions of the structure of teaching we can find in the works of J. Comenius, I. Herbart, V. Disterveg, D. Dewey, K. Ushinsky. Further development of the conceptions were in works of Piaget, J. Brunner, I. Linhart, L. Vygotsky, S. Rubinstein and others. Despite of the difference and originality of conceptions of learning structure they are suitable for generalization, necessary for further analytic formalization in mathematical model of the learning process.

Especially interesting is the problem of modeling of the educational process of discipline that requires a specific definition of educational process from this subject with the purpose of further consideration in construction of the model.

The purpose of the article is in defining the characteristic distinguishing features of the process of teaching physics and formulating basic principles of analytical formalization of the process with aim of numerical modelling.

The analytical formalization of complex integrating of creative and analytical skills as a required final result should be one of the distinguishing features of the mathematical model in the process of physics teaching. The educational process can be formalized as a mathematical model in the form of differential equations. The final record of such equations requires the development of techniques for experimental determination of numerical values of weighting coefficients of variables that characterize the individual properties of educational process.