Ivanov

Model Development and Optimization



At present, concerning intensive development of computer hardware and software, computer-based methods for modeling of difficult problems have become the main technique for theoretical and applied investigations. Many unsolved tasks for evolutionary systems (ES) are an important class of such problems. ES relate to economic systems on the whole and separate branches and businesses, scientific and art centers, ecological systems, populations, separate species of animals and plants, human organisms, different subsystems of organisms, cells of animals and plants, and soon. Available methods for modeling of complex systems have received considerable attention and led to significant results. No large-scale programs are done without methods of modeling today. Power programs, health programs, cosmos investigations, economy designs, etc. are a few examples of such programs. Nevertheless, in connection with the permanent complication of contemporary problems, existing means are in need of subsequent renovation and perfection. In the monograph, along with analysis of contemporary means, new classes of mathematical models (MM) which can be used for modeling in the most difficult cases are proposed and justified. The main peculiarities of these MM offer possibilities for the description ofES; creation and restoration processes; dynamics of elimination or reservation of obsolete technology in ES; dynamics of resources distribution for fulfillment of internal and external functions ofES; and so on. The complexity of the problems allows us to refer to the theory and applications of these MM as the mathematical theory of development. For simplicity, the title "Model Development and Optimization" was adopted.

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