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On Dynamic Models in Medicine and Biology*

We present in what follows the results of researchers concerning some mathematical models applied to medical and biological sciences.

1. Compartmental models in pharmacodynamics.

Starting from the qualitative analysis of the circulation of a drug in the body, models are constructed allowing for the envisaging of the drug's concentration in various organs or in the blood. This knowledge may serve in the working out of a treatment strategy. Studies in this respect are made for digoxin at the Central Military Hospital.

2. Epidemiological models

Models giving the evolution of the number of sicknesses are written in keeping with various parameters. The qualitative and quantitative analysis is such models can be at the basis of the anti-epidemic strategies. Such models are studied at the Institute of Virusology.

3. Dynamic models of virotic diseases

Models allowing for the knowing in time of the concentration of virus and of the concentration of substances produced by the immunization system, have been worked out in the Soviet Union, under the leadership of Acad. G.I. Marciuc. The study of such models and their simulation on the computer may serve in the establishment of treatment strategies. Some of such models have been considered at the Institute of Virusology, as well.

4. Models of cancer origin and evolution

Such models may allow for estimating the critical level of cancerogenic substances.

5. Models for enzymatic reactions

Such models appear in industrial production based on fermentation processes. They can be ordered and some interesting optimizing problems appear in concrete situations.

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6. Models of optimal harvesting of reproducible resurces

Such models have long been used in the rational exploitation of fishing resources. They are leading to interesting problems of optimizing systems with incomplete data.

7. An essential component in the utilization of such models is the existence of a proper method of identifying parameters by starting from observation or experimental data. Similarly, a direction of important research is represented by the consideration of random factors.