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Obituary: Blagovest Sendov 8 February 1932 - 19 January 2020

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I first met Blagovest Sendov in 1963 as a student in mathematics at the Faculty of Physics and Mathematics at Sofia University. His first lecture was devoted to Mathematical modeling. On some real life situations Prof. Sendov revealed to us the philosophy of science. Prof. Sendov's "philosophy" included a deep understanding of the mechanisms of the underlying real processes, the mathematical description of these processes using contemporary mathematical theories and the solution of the formulated mathematical problems using advanced numerical and computational tools. Prof.

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Sendov possessed an enormous ability to formulate difficult tasks and problems that need years of efforts to be resolved. At the weekly seminar of "Mathematical modeling" he used to pose such difficult problems and to make us young collaborators enthusiastic about working on them. He never pressed anybody of us to work on something particular, but he waited that everybody chooses a theme of interest by himself.

An important area of mathematical applications is the area of biology. Prof. Sendov has remarkable achievements in the field of mathematical modeling in biology. In the period 1965–1971 Prof. Sendov collaborated actively with Dr Roumen Tsanev, an excellent molecular biologist, and also a very competent mathematician. In the summer of 1965 Prof. Sendov and Dr. Tsanev began joint work on the hypothetical mechanisms for cellular proliferation, differentiation and carcinogenesis, suggested by Dr. Tsanev. The two scientists wanted to establish whether a mechanism for cellular activity based on interrelated genes is logically possible to function. They decided to use the newly installed computer in the Institute of Mathematics at the Bulgarian Academy of Sciences to study a model of cellular activity based on a network of genes interrelated on the basis of equations describing the synthesis of mRNA, controlled by DNA-protein interactions and programming the ribosomes for the synthesis of proteins. During the next several years both had many discussions on the formulation of a suitable mathematical model. Prof. Sendov tried many formulations and performed multiple computer experiments.

The results of an active collaboration with long discussions and computer experiments led to several modifications of the models, which were reported in a series of joint papers during the period 1965 - 1971. These papers are devoted to modeling of different biological objects such as epidermis and liver, or different processes such as cellular activity, cellular differentiation and carcinogenesis. The main result of these investigations (keeping in mind that the eukaryotic cells have to undergo cytodifferentiation) was that this process has to be controlled by an independent information, which is not necessarily semantically connected to the genetic information. This independent information

was postulated as an epigenetic code. This mathematical model of living cells in a multi-cellular organism, based on the existence of an epigenetic code, was able to explain uniformly the processes of embryonic development, cytodifferentiation, vegetative reproduction, somatic embryogenesis, carcinogenesis and even the emergence of new forms of natural selection. All this is explained in their 1971 paper in the Journal of Theoretical Biology, with more than 300 references to experimental results showing agreements with the results of their mathematical model.

During several years a great number of scientific papers were published, amongst them four papers in the Journal of Theoretical Biology, a survey paper in "Uspehi Mathematicheskih Nauk" and a monograph in Russian. The collaborative work of Sendov and Tsanev is a typical example of tight interaction between the two sciences biology and mathematics. From one side biology benefits from mathematics, from the other side mathematics also benefits, as novel interesting problems and suitable tools for their solution appear.

Blagovest Sendov was a great supporter of the series of conferences on Biomath, which was initiated in 2011, with wide and growing international support. In the photo Prof Sendov presents the Sign of Honor of the Bulgarian Academy of Sciences to Prof Jean Lubuma, a member of the International Steering Committee of the conference series Biomath for his outstanding research and contribution to developemnt of research links with the Bulgarian Academy of Sciences.