

The Differential-Delay Equations of Cancer Genetic Mechanisms

Mahruy Saidalieva, Mohiniso Bahromovna Hidirova

Centre for the Development of Software and Hardware Program
Complexes at Tashkent University of Informational Technologies,

Department of Regulatorika, Tashkent, Uzbekistan

regulatorika@yahoo.com

Keywords: Differential-delay equations, Mathematical modeling, Cancer genetic mechanisms.

Results of qualitative analysis of the nonlinear functional-differential equations quantitatively describing activity of molecular-genetic system of an organism at norm and at a cancer are given [1,2]. Qualitative research of the considered equations and their model systems has shown presence trivial attractor (O), existence opportunity of unstable equilibria (A) and positive attractor (B) with infinite basin on the first quadrant of phase space. The positive attractor can lose own stability with the advent of auto-oscillations. Quantitative analysis (using PC at computation of parameter dynamics for Lyapunov's number and Hausdorff's measure) has shown that the positive attractor can be transformed into a strange attractor. Then auto-oscillations turn to irregular oscillatory decisions. Study of the parametrical portrait of model system for the functional-differential equations for molecular-genetic system of an organism has shown complex structure of chaos area and presence of failure area for oscillatory decisions in trivial attractor basin (one of the variants of "black hole" effect) [1]. Study of genetic mechanisms of origin and developments of cancerous cells on the basis of the received results, has shown the possibility and successfulness of hypotheses about existence in genome the ADS (Autonomous Development Systems), which operate the early embryonic development. ADS activation in somatic cells can bring to cancer origin.

References

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