THE STRUCTURE OF A CHAOS OF STRANGE ATTRACTORS WITHIN A MATHEMATICAL MODEL OF THE METABOLISM OF A CELL

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S u m m a r y

This work continues the study of the earlier constructed mathematical model of the metabolic process running in a cell. We will consider autooscillations arising on the level of enzyme-substrate interactions in the nutrient and respiratory chains, which leads to the self-organization in autocatalysis of the integral metabolic process in cells. The autooscillations organize themselves in the total metabolic process of cells at autocatalysis. The behavior of the phase-parametric characteristic under a high dissipation of the kinetic membrane potential is analyzed. All possible oscillatory modes of the system and the scenario of formation and destruction of regular and strange attractors are studied. The bifurcations of the transitions "order-chaos", "chaos-order", "chaos-chaos" and "order-order" are calculated. The total spectra of Lyapunov indices and the divergences for all types of attractors on a part of the phase-parametric characteristic under consideration are determined. For various types of strange attractors, their Lyapunov dimensions, Kolmogorov–Sinai-entropies (KS-entropies), and "predictability horizons" are calculated. Some conclusions about the structure of the chaos of strange attractors and its influence on the stability of the metabolic process in a cell are drawn.