

MODERN METHODS OF MATHEMATICAL MODELING OF ENVIRONMENTAL CHEMICAL AND BIOLOGICAL PROCESSES

S. O. Travin

Semenov Institute of Chemical Physics, Russian Academy of Sciences, Moscow, Russia,

*e-mail: TravinSO@yandex.ru

Received March 19, 2018

Abstract – The role and significance of a numerical experiment in studying ecochemical systems are considered. The reasons are analyzed why most of the information on dynamics of interactions of natural ecosystem components cannot be obtained only by *in situ* measurements (*in vitro*), which determines the dominant role of mathematical models and conducting numerical experiments (*in silico*). The main differences between natural ecosystems and chemical reactions in laboratory and industrial conditions are formulated. The particular focus is placed upon the possibility of self-organization of matter and establishing truly non-stationary cyclic oscillatory regimes in open ecological systems.

Keywords: quantitative ecology, mathematical modeling, dynamical systems, limit cycle, Lorenz attractor.