

Ilya Akberdin^{*,1}

Fedor Kazantsev¹

Maxim Ri¹

Natalya Ri¹

Vladimir Timonov^{1,2,3}

Tamara M. Khlebodarova¹

Vitaly A. Likhoshvai^{1,2}

¹DEPARTMENT OF SYSTEMS BIOLOGY, INSTITUTE OF CYTOLOGY AND GENETICS, SIBERIAN BRANCH OF THE RUSSIAN ACADEMY OF SCIENCES, LAVRENTYEV AVE., 10, NOVOSIBIRSK, 630090, RUSSIA

²NOVOSIBIRSK STATE UNIVERSITY, NOVOSIBIRSK, PIROGOVA STR. 2, 630090, RUSSIA

³SIBERIAN STATE UNIVERSITY OF TELECOMMUNICATIONS AND INFORMATION SCIENCES, NOVOSIBIRSK, KIROVA STR. 86, 630102, RUSSIA

e-mail: *akberdin@bionet.nsc.ru

Automatic generation of mathematical models of molecular-genetic systems

Mathematical models of molecular-genetic systems are based on the information about the structural and functional organization of gene networks and their dynamic properties that disseminated over hundreds and thousands of scientific papers. The problem arises of data comparison and analysis of non-uniformed experimental data, analysis of cause-and-effect relations between molecular structure, dynamics and phenotypic features of molecular-genetic system, and software development for automatic generation of mathematical models, storage of creating models in the database and their numerical analysis. In the context of solving some of the above mentioned problems we have developed an integrated computer system and models database that do not only render automatically the process of mathematical models reconstruction based on the structural and functional organization of gene networks but also implements original approaches and algorithms to modeling and studying molecular-genetic systems. The examples of using of the system are demonstrated on a modeling of some gene regulatory networks.