B&BE Special Issue BIOMATH 2011

Editorial

The strong interaction between mathematical and life sciences is characteristic for the current development for both areas [1]. This interaction is accelerated by forums where mathematicians and biologists meet together. The International Conference on Mathematical Methods and Models in Biosciences (BIOMATH, [2]) is an annual event devoted to recent research in biosciences based on applications of mathematics as well as mathematics applied to or motivated by biological applications. It is a multidisciplinary forum for researchers who develop and apply mathematical and computational tools to study phenomena in the broad fields of life sciences, such as biology, ecology, medicine, biotechnology, bioengineering, environmental science, etc.

The 2011 International Conference on Mathematical Methods and Models in Biosciences and School for Young Scientists (BIOMATH 2011,[3]) held in Sofia, 15-18 June 2011 was an international meeting that gathered researchers from four different continents and 16 different countries. BIOMATH 2011 continues a tradition of scientific meetings on biomathematics held at the Bulgarian Academy of Sciences (BAS) in Sofia since 1990. Selected papers presented at the international conference BIOMATH-95 were published in the international journals Computers & Mathematics with Application [4] and J.UCS [5]. The BIOMATH 2011 conference was supported by several research units of BAS and three Bulgarian Universities as well as by the Union of Bulgarian Mathematicians. The Conference was dedicated to the memory of Dr Roumen Tsanev -- a prominent biologist and a pioneer of bio-mathematical modeling in Bulgaria.

About 70 scientific lectures were presented at BIOMATH 2011. This special issue contains a selection of 14 scientific papers focused on biological, biotechnological and biomedical studies.

All papers have been subjected to the usual peer-review process of the journal based on the reports of at least two independent anonymous reviewers. Papers presented at BIOMATH 2011 focusing on mathematical and computational methods and tools applied to biological processes are published in a special issue of the international journal Computers & Mathematics with Application.

According to their biological applications the papers in the present issue can be conditionally classified in three groups, as follows.

Bacterial growth, biotechnological and biochemical processes, enzyme kinetics

Venko Beschkov, T. Sapundzhiev, I. Angelov, Modeling of Biogas Production from Glycerol by Anaerobic Process in a Baffled Multi-staged Digestor

Husein Yemendzhiev, Plamena Zlateva, Zlatka Alexieva, Comparison of two Fungal Strains Biodegradation Capacity toward Mixture of Phenol and Cresol by Mathematical Modeling

Tatiana Ilkova, Mitko Petrov and Olympia Roeva, Optimization of a Whey Bioprocess Using Neuro-dynamic Programming Strategy

Yuri Pavlov, Peter Vasilev , Preferences and Determination of the Nominal Growth Rate of Fed-batch process: Control Design of Complex processes

Olympia Roeva, Tsonyo Slavov, PID Controller Tuning based on Metaheuristic Algorithms for Bioprocess Control

Elica M. Petrova, Assessment of the influence of Ca2+ and pH on bacterial growth of Acidithiobacillus ferrooxidans

Molecular dynamics, biomedical applications

Miglena Kirilova, Dessislava Pashkouleva, Vasil Kavardzhikov, A selection of hernia meshes on the basis of experimental results for abdominal layers

Nadia Antonova, On some Mathematical Models in Hemorheology

Valeriya Simeonova, Ivan Popov, Dimitar Vasilev, Estimation of sequencing error rates present in genome databases

Antony Popov, Simeon Antonov, Rough Sets in Biometrics and Biomedical Informatics

Petar Konovski, A Common Approach to Finding the Optimal Scenarios of a Markov Stochastic Process over a Phylogenetic Tree

Peter Vasilev, Krasimir Atanasov et al. Generalized Model of an Intuitionistic Fuzzy Clustering Technique Applied to Biomedical Data.

Ecosystems, population dynamics

Nina Pesheva, I. Stefanov, S. Slavchev, Modelling Water-gas Flows in Artificial Soils with Plants by a Modified Invasion Percolation Model

Khaled Khanchouch, Mohamed R Hajlaoui, Hakan Kutucu, A Biomathematical Model for Phoma Tracheiphila Citrus Resistance Screening

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References:

[1] Cohen, J. E., Mathematics is Biology's next Microscope, only better; Biology is Mathematics' next Physics, only Better. PLoS Biol 2(12) (2004): e439. doi:10.1371/journal.pbio.0020439

[2] http://www.biomath.bg

[3] http://www.biomath.bg/2011

[4] Ullrich, Ch., S. Markov (Guest Editors), BIOMATH-95, Computers & Mathematics with Applications 32 (11), December 1996, 123 pp. http://www.sciencedirect.com/science/journal/08981221/32/11

[5] Markov, S., Ch. Ullrich (Guest Editors), BIOMATH-95, J. UCS, 2, 2, February 1996, 58{95, http://www.jucs.org/doi?doi=10.3217/jucs-002-02

Guest Editors

Venko Beshkov
Institute of Chemical Engineering
Institute of Mathematics and Informatics
Bulgarian Academy of Sciences
“Acad. G Bonchev" St. Block 103, 1113 Sofia, Bulgaria
bioreac@bas.bg

Svetoslav Markov
Institute of Mathematics and Informatics
Bulgarian Academy of Sciences
“Acad. G Bonchev" St. Block 8, 1113 Sofia, Bulgaria
smarkov@bio.bas.bg