

## OPPONENT REVIEW

Competition for holding of academic position “Associate Professor”, gazetted on 10 February 2023, No 14

**One candidate:** Ivan Radoslavov Georgiev

**Procedure Notifier:** TSU “Information Modeling”, Institute of Mathematics and Informatics, BAS – Sofia

**Professional Direction:** 4.6 Informatics

**Scientific Subject:** Informatics (Modelling of Large-Scale Complex Systems)

**Opponent:** Prof. Michail Todorov, PhD, Dept of Mathematical Modeling and Numerical Methods, Faculty of Applied Mathematics and Informatics by the Technical University of Sofia, Bulgaria, by order 186/07.04.2023 of the Director of Institute of Mathematics and Informatics, BAS - Sofia

### 1. Short biographical record of the applicant

Dr Ivan Georgiev was born in 1983. He undergraduated A. Kanchev University of Ruse, subject mathematics and informatics in 2005 and two years later in 2007 he graduated the same university, subject Information and Educational Technologies. He was part-time tutor (2005-2009) and since 2009 he has been Assistant Professor, Senior Assistant Professor (2016), and Assoc. Professor (2022) in the Dept of Applied Mathematics and Statistics by the A.Kanchev University of Ruse. In May 2011 Dr Georgiev visited Comenius University in Bratislava (Slovakia). Mean-while he took his PhD degree in Mathematical Modeling and Math Applications in 2015, thesis title “Imbedded Interface FEM for elliptic and Parabolic Problems.”

### 2. General description of the competition documents

I checked up the IMI-BAS Regulations and assured that the applicant filled the compulsory documents, including CV, PhD diploma, document for academic position, information about minimal national requirements (NCID), 2 lists of citations, author information for the scientific contributions related to the given competition supplied by PDF copies of all the articles, list of research competitions, abstracts of refereed publications.

### 3. General characterization of the research, teaching and applied activities

The results are presented in complement conferences in BG and abroad. The total scientific contribution of Dr. Georgiev consists of 90 works (1 monography, 2 chapters, 1 manual, 7 journal papers and the else works in conference proceedings, part of them with SJR). Two works are self-dependent and the else with two or more co-authors. The applicant does not present a confirmation for equivalent co-authorship and this is the reason to suppose that his participation

is at least of equal value. The applicant presents a citation reference containing 41 citations in the period 2017-2002 all of them SJR indexed.

The applicant presents 22 works for the competition including 8 works equivalent to 1 habilitation monography and 15 works, 1 of them journal paper. All the papers are SJR indexed. The works are published in the period 2017-2021, i.e., they are not included in any previous competitions. The journal works are published in *Transport Problems* and *TEM Journal*. The proceedings works are in Springer, AIP CP and IOP. More details one can see in the following

**Table:** Information about the works

	Abroad
Works – 1+5+10 numbers	<i>Transport Problems - 3 numbers., TEM Journal - 2 numbers, IOP – 3 numbers, American Institute of Physics Conference Proceedings –5 numbers., MATEC – 2 numbers., Springer – 1 number</i>
Reports on national and international scientific events > 10.	<i>AMiTaNS –5 times, IOP – 3 times, MATEC – 2 times, etc.</i>

Dr Georgiev has taken part in 13 projects granted by the Ruse University Science Fund. Also, he contributed the creation of a scientific-educational laboratory for investigation and modeling of real processes. Dr Georgiev realized short-term (1-month) specialization in the Comenius University in Bratislava (Slovakia).

Having in mind the said above and according with the Regulations in the IMI-BAS I can conclude that the applicant covers the requirements to hold the academic position of Associate Professor in the professional subject 4.6 Informatics. Also, he covers and exceeds the minimal national regulations of LDASRB and has not any plagiarism in his works.

#### **4. Analysis of the scientific and applied contributions**

Dr Georgiev presents comprehensive author information where he claims his scientific and applied contributions. Though at a first glance no unidirectional his works can be grouped in 2 parts: Queueing Theory applied to transport services; modeling of heat and combustion processes in ecology and air pollution; financial mathematics. Let us consider them briefly.

An approach to predict the time series based on a numerical solution of ODE systems is developed. An informatics model is coded in MATLAB applied to successful solving of various problems in finance, ecology, air pollution.

Also, an informatics model is created in order to prognosticate and control the heating in a room. This is a very topical problem related to the energy efficiency of the buildings.

Another information model refers to the bee-keeping and related to it pollination of agricultural cultivation. It has to do with multicriterial optimization and its program implementation – again on MATLAB environment. In the given multicriterial model the optimal Pareto solutions are obtained.

Yet, various ways to optimize financial portfolio (Markowitz' theory) by monocriterial and multicriterial diversification.

An information model describing multimodal and intermodal transport in the river of Danube is developed. An analysis and respective predictions via modeling of time series are done. The classical as well as ARIMA methods are used. The next investigations of the transport service in Rousse and the region are similar. The assembled information is a ground of modelled queueing system. The goal is to evaluate the possible improvements in the frame of the infrastructure. The problem is rendered to large systems of differential-algebraic equations and the methods of their resolving. The treatment is implemented again in MATLAB environment.

## **5. Importance and contribution to the science and practice. Citations by other authors**

In my opinion, the works of the applicant indicate the achievements and accents in his scientific production. The conducted investigations possess mainly applied significance. Undoubtedly Dr Georgiev holds and can apply effectively the information technologies, which he complements by profound information knowledge and experience so needed for the successful research. The results obtained got publicity and recognition in BG. In order to become internationally known the applicant and his collaborators definitely need to increase their publication activity abroad.

## **6. Critical remarks and recommendations**

I have not any remarks and criticisms. The documents give a real imagination about the scientific activity of the applicant. The statement demonstrates a deep understanding of the studied matter. The reference to the regulations for holding of academic positions demonstrate explicitly that Dr Georgiev covers the minimal scientific criteria for associate professor in mathematical sciences: Group A – 50 points, required 50; Group B – 144 points, required 100; Group Γ – 269 points, required 220; Group Д - 246 points, required 70, group E – 80 points, required 20. The works are published in journals with SJR. The number of citations is 21. In my opinion, the applicant is well qualified and inspired to carry out further investigations on mathematical and stochastic modeling and numerical methods and information technologies, and to apply them for solving of relevant problems. Yet, the gained level of knowledge requires Dr Georgiev to keep developed this research topic attracting graduate and postgraduated students to train. The main recommendation, however, is the necessity of publication activity in high-ranked journals as well as a development of new research directions.

## **7. Personal impression**

I have known Ivan Georgiev since 2010. He attended AMiTaNS'10 in Sozopol and took part in the poster session. In 2015 I was involved to be opponent of his PhD thesis and took part in his defence. He strikes me as a modest but exact and efficient young professional, who permanently strives for mastering of new matters.

## **Conclusion**

Gaining an impression for the all-round scientific and research activity of the applicant and having in mind the legal national rules and criteria (LDASRB) as well as the specific

rules in IMI-BAS I **rate positively** the entire activity. On the strength of virtue of the law I **propose Dr Ivan Radoslavov Georgiev** for academic position Associate Professor in the TSU “Information Modeling” by the Institute of Mathematics and Informatics, BAS - Sofia, Professional Direction 4.6 Informatics, Scientific Subject: Modelling of Large-Scale Complex Systems.

Opponent

(Prof. Michail Todorov)

Sofia, May 26th 2023