



REVIEW

Of Materials Submitted for Participation in Contest
For Occupying Academic Position Associate Professor
in Professional Field 4.5. Mathematics
(Mathematical Analysis),
At University of Forestry, Sofia,
Faculty of Forestry Industry

Department of Mathematics, Physics and Informatics
Candidate: Chief Assistant Yuri Mitkov Dimitrov, PhD
Reviewer: Prof. Nadezhda Kostadinova Ribarska, DSci
April 10th, 2022

Chief Assistant Yuri Mitkov Dimitrov, PhD is the only one candidate in the contest for occupying the academic position "Associate Professor" in: scientific area 4. Natural Sciences, Mathematics and Informatics, professional field 4.5. Mathematics (Mathematical Analysis) for the needs of University of Forestry, Sofia, Faculty of Forestry Industry, announced in State Gazette no. 102 of 7 December 2021. He is born on August 8, 1971. He graduated in Faculty of Mathematics and Informatics of Sofia University "St. Kliment Ohridski" in 1996. He was a Tempus exchange student in University of East Anglia, Norwich, UK, in 1993-1995. Yuri Dimitrov obtained M.Sc. Degree in Mathematics at Michigan Technological University, Houghton, USA (1996-1998). He defended his Ph. D. thesis in Mathematics at Ohio State University, Columbus, USA under the guidance of Prof. G. Edgar in 2006. Then from 2008 to 2010 he obtained another M.Sc. Degree – in Computer Science – at Ohio State University, Columbus, USA. After his coming back to Bulgaria, he obtained another PhD in Mathematics at University of Ruse "Angel Kanchev", Ruse (2013-2016). His thesis titled "Numerical methods for some classes of fractional differential equations" is written under the guidance of Prof. L. Valkov. Since 2016 Dr Yuri Dimitrov is teaching in the University of Forestry, Sofia.

Dr Yuri Dimitrov has submitted for participation in the contest a full set of documents and materials, which complies with the Regulations on the Academic Staff Development in the Republic of Bulgaria, the Regulations for their application and with the respective regulations for acquiring scientific degrees and holding academic positions of University of Forestry, Sofia.

The research interests of Dr Yuri Dimitrov are in the field of numerical analysis, more precisely approximations of fractional derivatives and numer-

ical solutions of ordinary or partial differential equations, as well as integral equations. The candidate has serious achievements in this field.

Dr Yuri Dimitrov submitted for the participation in the present contest for Associate Professorship 26 publications, of which 25 have already been published and one is accepted for publication. Four scientific papers presented by the applicant have been used in his PhD thesis in Bulgaria and two of them have been used in his PhD thesis in the USA. The articles in peer-reviewed scientific journals are 19, of which 2 are published in journals with impact factor and 3 – in journals with impact rank. Four book chapters are presented as well. The individual publications are 6. I have no doubt that Dr Yuri Dimitrov has contributed at least an equal share to all joint publications.

The scientific papers submitted for the competition satisfy the minimal requirements of the law (under Art. 2b, para. 2 and 3 of ZRASRB) for occupying the academic position "Associate Professor" in the scientific area and the professional field of the competition. In fact, the minimal requirements are significantly exceeded.

As already mentioned, most of the works submitted for the competition are devoted to approximations of fractional derivatives and to applications of the results obtained. The complexity of the techniques used and the thoroughness of the investigation in the paper [3] of the list of publications (45 pages) are impressive. The constructed approximations are used to determine implicit difference approximations for the sub-diffusion equation which have second order accuracy with respect to the space and time variables, and second and third order numerical approximations for ordinary fractional differential equations. It is worth mentioning that proofs of the convergence of the numerical solutions are given in three of the individual papers of the applicant and, as well, almost all of the citations of the candidate cite the works in question. Although I am not an expert in the field, I think that these works are the most serious achievement of Dr Yuri Dimitrov.

The first two papers in the list of publications are devoted to the investigation of self-differential functional equations: analytic solution, existence and uniqueness of the solution, study the asymptotic behavior of the eigenvalues of the respective integral operator. The results are interesting. It is a pity that they didn't get enough attention because of the lack of motivation (from applications).

The rest of the presented works contain applications, some of which substantially making use of the results of the author on approximations of fractional derivatives and numerical solutions to integral differential equations. Here are some of the topics: numerical solution of the fractional Black-Scholes equation, European style options with an exponential payoff function, international migration forecasting based on the Bayesian statistics, sensitivity analysis of some air pollution and meteorological models, Monte Carlo algorithms.

Dr Yuri Dimitrov presented 47 citations in the documents for the contest.

Note that 39 of the citing papers are published in journals with impact factor. It is easy to find out that there are citations of the papers of the applicant which have not been presented. This proves that the works of the candidate are appreciated by the mathematical community.

Dr Yuri Dimitrov has teaching experience as well. The candidate has taught in Ohio State University, Columbus, Michigan Technological University, Houghton, University of Forestry, Sofia. I am personally acquainted with his pedagogical activity at the Department of Mathematical Analysis, FMI of Sofia University "St. Kliment Ohridski". He is a serious and responsible teacher. We can rely on him.

I have no doubt that Dr Yuri Dimitrov has an equal contribution to all joint articles.

No plagiarism was found in the publications submitted for assessment.

CONCLUSION:

The scientific achievements of Dr Yuri Dimitrov, both in terms of quality and quantity, do not leave any doubt in the positive assessment of his research and pedagogical activity.

I recommend the scientific jury to prepare a report-proposal to the esteemed Faculty Council of the Faculty of Forestry Industry of University of Forestry, Sofia to elect Chief Assistant Yuri Mitkov Dimitrov, PhD for the academic position "Associate Professor" of University of Forestry, Sofia in Scientific Area 4. Natural sciences, Mathematics and Informatics, Professional field 4.5. Mathematics (Mathematical Analysis).

10.04.2022



(Prof. N. Ribarska, DSci)