

OPINION

about the competition for acquiring
the academic position of **Associate Professor**
announced by the University of Forestry
in Newspaper of State, No. 102 of 07.12.2021

Field of Higher Education: **4. Natural Sciences, Mathematics and Informatics**,
Professional Field: **4.5. Mathematics**,
Scientific Specialty: **Mathematical Analysis**,
in the discipline **Higher Mathematics**,
for the needs of the Department of **Mathematics, Physics and Informatics**,
procedure code WWI -Asp -1121-76.

Written by: **Velika Ilieva Dragieva**, PhD, Associate Professor in University of Forestry,
now retired,

The only applicant: Chief Assistant Professor **Yuri Mitkov Dimitrov**, PhD

I. General description of the presented materials.

The materials presented by Ch. Assistant Professor Dr. Yuri Dimitrov for participation in the competition, I find relatively well-formed and detailed. The most important of them and some of the information contained therein are:

1. Professional CV on the European model, according to which Dr. Yuri Dimitrov graduated from high school in 1989 at the Mathematical High School "Baba Tonka", Ruse; from 1989 to 1996 he was a student at FMI-Sofia University "St. Kliment Ohridski", majoring in Mathematics, graduating with a Master's degree. In the period 1993-1995 he was a student at the University of East Anglia, Norwich, Great Britain, in the Tempus program for student exchange.

According to the autobiography, the periods from 1996 to 2010 are both periods of educational qualification and teaching activity (assistant): from 1996 to 1998 at Michigan University of Technology, Houghton, USA (educational qualification Master of Mathematics); from 1998 to 2010 at Ohio State University, Columbus, USA (from 1998 to 2006 educational qualification Doctor of Mathematics and from 2008 to 2010 educational qualification Master of Computer Science).

From 2013 to 2016 he was a full-time doctoral student in the doctoral program "Mathematical Modeling and Application of Mathematics" at the University of Ruse "Angel Kanchev", where he defended his dissertation on "Numerical methods for classes of fractional differential equations".

Since 2016 he has been working at the University of Forestry, Sofia, initially as an assistant, later as a chief assistant.

The autobiography also mentions participation in the 1989 Balkan Mathematical Olympiad in Split, Croatia, where Yuri Dimitrov won a silver medal.

I find that the English version of the CV gives more complete and accurate information than the Bulgarian one. For example, from the Bulgarian version it is not clear with what qualification, bachelor or master, Yuri Dimitrov graduated from Sofia University in 1996. He writes - Diploma of Higher Education, while in the English version he writes accurately and clearly - M. Sc. And similar.

2. General list of publications, 26 in number, which specifies which of them were used in the defense of the PhD dissertation in 2017, 4 in number. The remaining 22 publications are participating in this competition.

I could not understand on what principle the order of the publications in this list is made - by the time of publication, by factor of the publication, or some other.

3. Self-signed author's reference for the scientific contributions of the publications for participation in the competition, summaries of the same publications in Bulgarian and English, as well as copies of the publications themselves

I find the reference to be very well prepared and accurately reflect the contributions of the articles in question, in some places it is stated that the respective publication is a continuation of a previous one. However, I think that it would be good if the report was prepared thematically, with a summary and sorting of the presented results, more fully and accurately reflecting the overall contributions of these results. I do not see the point of two identical lists - one only with the titles of the articles, and the other, plus the titles to contain the contributions.

4. General list of citations, containing 47 observed citations. The candidate participates in this competition with all citations from the general list. They are on two self articles of Ch. Assistant Professor Dr. Yuri Dimitrov, one of which was used in the defense of his doctoral dissertation. All citations of this article, 40 in number, are in journals with impact factor, only by foreign authors. The other cited article has 7 citations, one of which is by Bulgarian authors. In my opinion, this is a significant recognition of the value of these papers.

5. Information for the fulfillment of the minimum national requirements according to ZRASRB. The reference shows that Yuri Dimitrov satisfies these requirements with much more than the necessary points.

There is no presented list of research projects with the participation of Ch. Assistant Professor Dr. Yuri Dimitrov.

II. General characteristics of the scientific activity of the candidate according to the materials submitted for participation in the competition.

Dr. Yuri Dimitrov participated in the competition with 22 articles, 4 of which were published in the period 2007-2009, and the rest - in the period 2017-2021. They have not been used in the procedure for obtaining the educational and scientific degree "Doctor".

Two of the presented papers are in journals with impact factor and high values of Q - indicators: one is with indicator Q1 (number [23] from the list of publications), and the other is with indicator Q3 (number [10] from the list of publications)). 6 of the publications are in editions with SJR without impact factor, and 14 are in other editions. All are in English. The presented publications are many in number, the level of the editions that published them is high and the points obtained are not only enough to cover the requirements necessary for holding the academic position of "associate professor", but also far exceed them. Of the publications submitted for participation in the competition, 3 are by the author alone, 3 are with one co-author, 6 are with two co-authors, 4 are with three co-authors. There are 2 publications with four co-authors, 3 with five co-authors and 1 with six. This shows the candidate's very good skills, both for individual performance and for teamwork and exchange of scientific ideas.

We have considered the citation of the candidate's works in the previous point.

III. Analysis of the scientific and scientific-applied achievements according to the materials presented for the competition.

The research activity of Ch. Assistant Professor Dr. Yuri Dimitrov is quite diverse, respectively the list of co-authors related to this activity is extensive.

Thematically, the presented articles can be divided into several groups.

The first topic can be defined as related to the solutions of functional differential and integral equations of a certain type. Articles [1] and [2] of the list of publications for participation in the competition are devoted to a self-differential functional equations. An analytical solution in a specific set of numbers is derived, as well as the conditions for the

existence and uniqueness of the solution, the integral operator of such equations and asymptotic estimates for the eigenvalues are considered. In [12] the authors propose a method for improving the accuracy of numerical solutions of ordinary and partial linear fractional differential equations with singularities. Fractional Taylor polynomials are used to transform these equations into ones that have smooth solutions. Works [9] and [22] are devoted to quadrature formulas with specific generating functions, their properties and conditions for the second order of accuracy and their applications for numerical solution of integral equations. The papers [24] and [26] also belong to this topic. In [24] approximations of the first derivative with exponential and logarithmic generating functions are constructed and applications of these approximations for numerical solution of differential equations are considered. In [26] the author derives approximations for fractional integral and applies them for numerical solution of the equation for relaxation-oscillation, transforming it into a fractional integral equation.

The second topic is perhaps a special case of the first, related mainly to approximations of the Caputo fractional derivative. Apart from the works used in the defense of the doctoral dissertation, the publications [10], [11], [21] and [25] are devoted to this topic. In [10] the Grunwald-Letnikov approximation with an offset for the Caputo derivative is considered, as well as a modification of this approximation. A method for constructing new approximations for the Caputo derivative is proposed and applications of these approximations for numerical solution of fractional differential equations are considered. In [11] the author considers other approximations for the Caputo derivative and their applications for numerical solution of fractional differential equations, comparing the accuracy of numerical solutions in different approximations. [21] and its continuation, [25] are analogous to the previous two, but the constructed approximations have exponential and logarithmic generating function.

Works [13] - [20] and [23] are related in one way or another to the Monte Carlo and quasi-Monte Carlo methods. [13] compares the efficiency and accuracy of quasi-Monte Carlo methods for numerical calculation of multidimensional integrals, to which the problem of the price of European options is reduced. In [14] these methods were used to calculate multidimensional integrals used in the Bayesian models for predicting international migration, and in [15] - to calculate integrals used in the stochastic analysis of sensitivity measures of the air pollution research model. The rest of the publications are devoted to Monte Carlo methods for numerical solutions of systems of linear equations ([16]), to multidimensional integrals with applications in financial mathematics ([17]), to multidimensional integrals arising in models for forecasting migration ([18]), for calculating non-proprietary multidimensional integrals ([19]). In all these publications an analysis of the efficiency and rate of convergence of the method used is made, as well as a comparison with other similar methods.

Finally, in [7] and [8] large self-organizing computer networks are studied, modeled by a combinatorial model in which the transition between the individual nodes of the network is given by a probability vector of the Markov chain.

I find that all the papers presented by Ch. Assistant Professor Dr. Yuri Dimitrov for participation in the competition for "Associate Professor" are interesting and high quality, containing theoretical results, with specific applications in practice. However, it seems to me that there are too many, and I would recommend to the candidate in the future not to scatter his efforts in a large number of publications, but rather to focus on better quality articles in more serious publications.

I have no other critical remarks, except for the few remarks made so far, mostly related to the design of the presented materials.

IV. Personal impressions.

We have been working with Yuri Dimitrov since he started working at the University of Forestry. We do not have common publications and we have not carried out joint research activities. But I have personal impressions of his teaching work. We taught the same exercises in Higher Mathematics and in Biostatistics, in which disciplines I gave the lectures. I think that he is extremely responsible for the teaching activity, he prepares each lesson very carefully and in detail, as well as current control during the semester. With him we have discussed in detail the method of testing, current control, the number of points. His suggestions were very appropriate and relevant, and contributed to an improvement and refinement of the way of teaching and testing.

CONCLUSION

The above gives me a reason to strongly recommend to the Honorable Scientific Jury to suggest to the Faculty Council of the **Faculty of Forest Industry** of the University of Forestry to select Ch. Assistant Professor Dr. **Yuri Mitkov Dimitrov** to take the academic position of **Associate Professor** in the field of higher education **4. Natural Sciences, Mathematics and Informatics**, professional field **4.5. Mathematics**, scientific specialty: **Mathematical Analysis**.

April 08, 20212

Signature:

/Assoc. Prof.  Velička Dragieva/