

## SHORT REVIEW

for a competition for the academic position Professor

in 4.5 Mathematics (Operations Research)

in Sofia University, Faculty of Mathematics and Informatics,

announced in State Newspaper 21/13.03.2020

The opinion was prepared by **Prof. Dr. Nikola Ivanov Yanev** in my capacity as a member of the scientific jury of the competition according to Order № 38-265 / 10.07.2020 of the Rector of Sofia University. The only candidate for participation in the announced competition has submitted documents: Associate Professor Nadia Peycheva Zlateva, Faculty of Mathematics and Informatics, Sofia University.

### Candidacy details

The documents submitted for the competition by the candidate comply with the requirements of the Law for Academic Staff Development in the Republic of Bulgaria, the Regulations to the Law and the Regulations on the terms and conditions for acquiring scientific degrees and holding academic positions at Sofia University "St. Kliment Ohridski".

For participation in the competition the candidate Nadia Peycheva Zlateva has presented a list of a total of 8 articles, incl. 8 (6 published and 2 accepted) in scientific journals. All are referenced in Web of Science (impact factor IF), Scopus (impact rank SJR) and MathSciNet and have not been used in the author's previous procedures for Doctor degree, Associate Professor position and Doctor of Science degree. The articles are available at: <https://fmi.uni-sofia.bg/bg/node/6058>

Evidences for participation in one national and two international (with EC) research projects (contracts) are presented:

**Nonlinear analysis: variation methods and optimization** (2018-2021), contract KP-06-N22 / 4 dated 04.12.2018, MES Bulgaria, head N. Zhivkov, basic organization IMI-BAS from the website of the NSF of the MES;

**Subdifferential Calculus**, Marie Curie fellowship, contract HPMF-CT-2001-01345, V FP of EC (2001-2003), [http://cordis.europa.eu/project/rcn/62173\\_en](http://cordis.europa.eu/project/rcn/62173_en) EC contract with the University of Montpellier II;

**Evolution equations for deterministic and stochastic systems** (2002-2006), Project ID: HPRN-CT-2002-00281, Funded under: FP5-HUMAN POTENTIAL

([https://cordis.europa.eu/project/rcn/64797\\_en.html](https://cordis.europa.eu/project/rcn/64797_en.html)) a letter from the project coordinator at the University of Brest about Zlateva's participation.

## **Candidate details**

**WORK EXPERIENCE** • Since 2005 at the Faculty of Mathematics and Informatics (FMI), Sofia University “St. Kliment Ohridski”, Associate Professor in Probability, Operations Research and Statistics Department, Lecturer in Linear Optimization, Nonlinear Optimization and Operations Research; Head of the Probability, Operations Research and Statistics (PORS) Department from March 2008 to March 2012 and acting from October 2017 to October 2018; Deputy Dean of FMI for Research and Development and Doctoral Studies (2011-2017), Chief Assistant and Assistant at the PORS Department (2000-2006), Research Associate I and Associate III degree at the Institute of Mathematics and Informatics, Bulgarian Academy of Sciences (1997-2006).

**SCIENTIFIC DEGREE** • February 2, 2018 Sofia University "St. Kliment Ohridski Doctor of Sciences in 4.5 Mathematics (Operations Research).

**EDUCATION AND TRAINING** • October 2004 - March 2005, Université de Bretagne Occidentale, Brest, France, post-doctoral specialization within the research network “Evolutionary Equations” under the VI Framework Program of the EU;

February 2002 - July 2003, Université Montpellier II, Montpellier, France, post-doctoral specialization with Marie Curie fellowship.

Educational and scientific degree Doctor in Mathematics (Operations Research) (28.06.1999).

Master of Mathematics with specialization in Operations Research and second specialization as mathematics teacher, diploma No. 120185 / 22.09.1993 from Sofia University “St. Kliment Ohridski”.

## **General characteristics of the scientific works and achievements of the candidate**

For participation in the competition Assoc. Prof. Zlateva presented 8 articles in peer-reviewed scientific journals, of which 6 have been published and 2 have been accepted for publication. All articles are journals that are referenced by Web of Science (with impact factor IF), Scopus (sympathetic rank SJR) and MathSciNet and have not been used in the author's previous procedures for doctor degree, for the associate professor position and for the degree of doctor of sciences. The articles from the list are available in full text at <https://fmi.uni-sofia.bg/bg/node/6058>

The research activity of the candidate and specifically the subject of the presented research papers are in the field of the competition. There is no legally proven plagiarism in the submitted scientific publications.

The points on the different indicators are:

Indicator A : dissertation for doctor degree - 50 points

Indicator B4: scientific publications, referenced and indexed in Web of science and Scopus - 135 points

Indicator G7: scientific publications, referred to and indexed in Web of science and Scopus, outside habilitation work – 273 points

Indicator D: citations - 240 points

Indicator E14: participation in a national research project - 10 points

Indicator E14: participation in international research projects - 40 points or a total for criterion E-125 points.

Thus, on the basis of the submitted documents I conclude that Assoc. Prof. Nadia Zlateva satisfies and even significantly exceeds the minimum national requirements (under Art. 2b, para. 2 and 3 of the Law for Academic Staff Development in the Republic of Bulgaria) and the additional requirements of Sofia University “St. Kliment Ohridski ” for holding a professor academic position in the scientific field and the professional area of the competition 4.5 Mathematics (Operations Research).

Assoc. Prof. Zlateva has published 29 articles in peer-reviewed scientific journals, which have over 270 citations and h-index 7 (in each of the WoS and Scopus systems).

### **Assessment of educational and pedagogical activity of the candidate**

Since his appointment in 2000 as Chief Assistant and after his reappointment as Associate Professor in the Department of Probability, Operations Research and Statistics at the Faculty of Mathematics and Informatics (FMI) at Sofia University “St. Kliment Ohridski” Assoc. Prof. Zlateva has a full classroom workload. She gives lectures on the courses in Linear Programming and Nonlinear Optimization - compulsory for students in Applied Mathematics and Statistics 3rd year and the course in Operations Research - compulsory for students in Informatics and Computer Science 2nd year and compulsory-elective for students in Software Engineering and Information Systems 2nd year. Lecture notes for the students have been prepared and are constantly updated for the courses, which are provided to them in the electronic moodle platform of the faculty.

### **Content analysis of the scientific and scientific-applied achievements of the candidate contained in the materials for participation in the competition**

The results published in the articles submitted for the competition can be divided into the following three groups:

1. use of perturbation spaces to minimize integral functionals [b2, b3];

2. surjectivity of maps in Frechet spaces [b5, b6];

3. new proofs of known results in the field of Variational Analysis [b1, b4, b7, b8].

The problem of minimizing an infinite-dimensional integral functional is considered, as in [b2] the integral function is convex, while in [b3] this is not obligatory. A general method for proving the existence of a solution of an appropriate integrant perturbation is presented, which preserves the type of the problem. For this purpose, a new variational principle has been developed, which allows to perturb only the integrant and thus to preserve the original type of the problem.

A surjectivity type result for multivalued maps in Fréchet spaces has been proved in [b5]. A simple and direct proof of an important case of the result from [b5] is presented in [b6].

A simple proof of Moreau-Rockafellar's theorem that a proper convex lower semicontinuous function on Banach space is determined up to a constant by its subdifferential is provided in [b1].

A new proof for maximal monotonicity of the subdifferential of a convex function is given in [b4].

In [b7] it is provided a new proof along the lines of the recent book of A. Ioffe [*Variational Analysis of Regular Mappings: Theory and Applications*, Springer Monographs in Mathematics (2017)] of a result of H. Frankowska [*Some inverse mapping theorems*, Ann. Inst. H. Poincaré, Anal. Non Linéaire 7 (1990) 183–234] showing that metric regularity of a multi-valued map can be characterized by regularity of its contingent variation – a notion extending contingent derivative.

A new method for proving Correa-Jofré-Thibault's theorem linking the monotonicity of the subdifferential and the convexity of the function is presented in [b8].

The abbreviations from [b1] to [b8] are according to the numbering of the articles in the list submitted for the competition and refer to the impact factor of the journals for the year of publication or the last available one:

[b1] Proceedings of the American Mathematical Society, vol:136, 2008, Web of Science IF (0.584 – 2008), Web of Science Quartile: Q2(101/215 Mathematics), SCOPUS SJR (1.174 – 2008)

[b2] Journal of Convex Analysis, vol:19,2012, Web of Science IF (0.625 – 2012), Web of Science Quartile: Q2(124/296 Mathematics), SCOPUS SJR (1.229– 2012)

[b3] Journal of Optimization Theory and Applications, vol:157, issue:3, 2013, Web of Science IF (1.406 – 2013), Web of Science Quartile: Q1(43/251 Mathematics Applied), SCOPUS SJR (0.928– 2013)

[b4] Journal of Convex Analysis, vol:24, issue:4, 2017, pages:1307-1311, ISSN (print):0944-6532, ISSN (online):2363-6394, Web of Science IF (0.627 – 2017), Web of Science Quartile: Q3(192/310 Mathematics), SCOPUS SJR (0.534 – 2017)

[b5] Journal of Optimization Theory and Applications, vol:182, issue:1, 2019, pages:265-284, ISSN (print):0022-3239, ISSN (online):1573-2878, Web of Science IF (1.388 – 2019), Web of Science Quartile: Q2(97/260 Mathematics Applied), SCOPUS SJR (0.894 – 2019)

[b6] Comptes rendus de l'Académie bulgare des Sciences, vol:72, issue:2, 2019, Web of Science IF (0.343 – 2019), Web of Science Quartile: Q4 (66/71 Multidisciplinary), SCOPUS SJR (0.218 –2019)

[b7] Journal of Convex Analysis, vol:27, issue:1, 2020, Web of Science IF (0.527 – 2019), Web of Science Quartile: Q4 (255/324 Mathematics), SCOPUS SJR (0.646 – 2019)

[b8] Journal of Convex Analysis, vol:27, issue: 4, 2020, Web of Science IF (0.527 – 2019), Web of Science Quartile: Q4 (255/324 Mathematics), SCOPUS SJR (0.646 – 2019)

All publications have the same first named author with a supposedly equal contribution from the applicant.

I have no significant critical remarks. The materials for the competition are well structured, and their content is detailed and correctly reflects the achievements of the candidate.

### **Personal impressions of the candidate**

I have known Zlateva since she started working at the Institute of Mathematics and Informatics, BAS, and apart from the standard impressions of collegiality and (not so standard) of intelligence, the most impressive is her devotion to mathematics and her serious commitment to the educational process. As Deputy Dean, she made significant efforts to implement optimization in practice and even in electoral legislation (she assists in assigning to the FMI the task of determining single-member constituencies for majoritarian elections in Bulgaria).

### **Conclusion on the application**

After getting acquainted with the materials and scientific works presented in the competition and based on the analysis of their significance and contained in them scientific and scientific-applied contributions, **I confirm** that the scientific achievements meet the requirements of the Law for Academic Staff Development in the Republic of Bulgaria, the Regulations to the Law and the Regulations on the terms and conditions for acquiring scientific degrees and holding academic positions at Sofia University "St. Kliment Ohridski" for holding the academic position of "professor" in the scientific area and professional field of the competition. In particular, the candidate satisfies the minimum national requirements in the professional field and no plagiarism has been established in the scientific papers submitted at the competition.

I give my **positive** assessment of the candidacy.

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## **OVERALL CONCLUSION**

Based on the above, **I recommend** the scientific jury to propose to the competent body for the selection of the Faculty of Mathematics and Informatics at Sofia University "St. Kliment Ohridski" **to elect** Nadia Peycheva Zlateva to take the academic position of "professor" in the professional field 4.5 Mathematics (Operation Research).

30.08.2020

Prof. Nikola Yanev