

# STATEMENT REPORT

by prof. Dr.Math.Sci. Kamen Ganchev Ivanov,  
Institute of Mathematics and Informatics, BAS

on the competition for the academic position Professor serving the needs of the Institute of Mathematics and Informatics, BAS, in the scientific field 4 Natural Sciences, Mathematics and Informatics, professional field 4.5 Mathematics, scientific specialty Mathematical Analysis, announced in State Gazette No. 43/17.05.2024.

I have prepared this statement report as a member of the scientific jury of the competition according to Order No. 206/16.07.2024 of the Director of the Institute of Mathematics and Informatics – BAS (IMI-BAS), following a decision of the Scientific council of IMI-BAS (Protocol No. 7/31.05.2024). The statement report has been prepared according to the requirements of:

- the Act on Development of the Academic Staff in the Republic of Bulgaria (ADASRB);
- the Rules for the Implementation of ADASRB (RIADASRB);
- the regulations on the terms and conditions for acquiring scientific degrees and occupying academic positions at the Bulgarian Academy of Sciences (RTCASDOAP-BAS);
- the regulations on the terms and conditions for acquiring scientific degrees and occupying academic positions at the Institute of Mathematics and Informatics – BAS (RTCASDOAP-IMIBAS);

Within the deadline, documents are submitted by one candidate:

associate professor Dr.Math.Sci. Emilia Grigorova Bazhlekova

## 1 General data about the applicant

Emilia Grigorova Bazhlekova graduated from higher education in 1986. as a master of mathematics at FMI of SU “St. Kliment Ohridski”. She received her PhD in Mathematics from the Eindhoven University of Technology, Eindhoven, The Netherlands, in 2001 (legalized in our country in 2011).

I note with great satisfaction that in 2022 Emilia Bazhlekova defended her dissertation at IMI-BAN on the topic “Subordination principle for generalized fractional evolution equations” and obtained the scientific degree “Doctor of Sciences”. It is commendable that her career growth goes hand in hand with serious scientific development.

Emilia Bazhlekova works (intermittently) at IMI-BAN consistently as a mathematician (since 1995), assistant professor (since 2011) and associate professor (since 2014). In separate periods she worked at the Eindhoven University of Technology, Eindhoven, The Netherlands, and in FMI and FzF of SU “St. Kliment Ohridski”. She has the Netherlands citizenship.

Assoc. prof. Bazhlekova is the author or co-author of 57 scientific publications including 41 articles in journals with IF/SJR. The articles in journals with IF are 23. She presented a list of 872 citations entered into the SONIX system of the BAS. According to Scopus, Emilia Bazhlekova’s scientific publications have been cited 464 times.

## 2 General characteristics of the applicant’s scientific work and achievements

Assoc. prof. Bazhlekova participates in the competition with 22 scientific publications, which were not used in the previous procedures of the ADASRB. She is a sole author of 4 articles, 16 publications are with one co-author, 1 has two co-authors and 1 has three co-authors. I believe that the contribution of individual co-authors in joint publications is equal.

Assoc. prof. Bazhlekova’s scientific interests are mainly in the field of differential equations with fractional derivatives. Two definitions of fractional derivatives are used – by Riemann-Liouville and by Caputo.

The topics of the presented articles can be described as:

- application of Dimovski's convolution calculus to study the solutions of fractional evolution equations and their presentation in Duhamel form [1, 2, 3, 9, 12, 13] (numbering according to the list of scientific publications for participation in the competition);
- analysis of linear viscoelastic models with fractional derivatives [7, 8, 10, 19, 20];
- questions about existence and uniqueness of solutions of inverse problems for fractional differential equations [15, 16, 22];
- study of numerical methods for fractional evolution equations [4, 5, 17];
- modeling of complex processes by fractional calculus [6, 11, 14, 18, 21].

These scientific works contain original results representing a significant scientific contribution. In my opinion, the candidate's contribution to the joint papers is mainly related to the analytical research. I have not noticed any plagiarism in the scientific works submitted for the competition.

Of the submitted articles, 18 were in IF/SJR journals, with 11 IF journal articles. This allows the candidate to satisfy with great ease the minimal requirements of RIADASRB, RTCASDOAP-BAS and RTCASDOAP-IMIBAS. For example, in group B she collects 134 points to satisfy the required 100 points, and in group D she collects 552 points against the required 220 points.

### **3 Reflection of the candidate's results in the works of other authors**

Assoc. prof. Bazhlekova's results are accepted with undisguised interest by her colleagues working in the field of fractional derivatives. Emilia Bazhlekova submitted a list of 220 citations (no self-citations of her or her co-authors) of the articles with which she participates in the competition. This allows her to collect 1320 points in group D of the minimal national requirements against the required 140 points.

Among the articles participating in the competition, the articles [4] (98 citations) and [1] (51 citations) have the most serious influence in the scientific publications of other authors.

## 4 Teaching experience and contracts and projects participation

In the documents submitted by the candidate, I did not find information about her teaching experience.

Her participation in contracts and projects is quite enough to cover group E of the minimal national requirements.

## 5 Critical remarks and recommendations

I have no critical remarks about the candidate. It is desirable in the coming years Emilia Bazhlekova to introduce her scientific results to young mathematicians, including to train and defend at least one PhD student.

## 6 Conclusion

Associate Professor Emilia Bazhlekova satisfies with ease and far exceeds the minimal requirements of ADASRB and the relevant regulations and, in particular, she meets the formal minimal requirements specified in Art. 2 and Art. 3 of RTCASDOAP-IMIBAS. Her research interests and publications are in the field of competition. She is the author of significant new results in the field of differential equations with fractional derivatives.

Based on the above analysis, I evaluate her candidacy **positively** and **recommend** to the Scientific Jury to propose to the Scientific Council of IMI **to select**

**assoc. prof. Dr.Math.Sci. Emilia Grigorova Bazhlekova**

**for the academic position Professor in the scientific field 4 Natural Sciences, Mathematics and Informatics, professional field 4.5 Mathematics, scientific specialty Mathematical Analysis.**

Sofia, 15.09.2024 г.

Signature:

(prof. Kamen Ivanov)