

# REVIEW

of the application for academic position “Associate Professor” at the Institute of Mathematics and Informatics

Research area: 4. Natural Sciences, Mathematics and Informatics,

Professional field: 4.5. Mathematics

Scientific specialty: Equations of Mathematical Physics

by prof. Snezhana Georgieva Hristeva-Kraeva, DSc, FMI, Plovdiv University “Paisii Hilendarski”

The position was announced in State Gazette No. 108, 2/12/2020. The current review is written in accordance with the law for development of academic staff in the Republic of Bulgaria (LDASRB) and complies with the rules for the implementation of the LDASRB, and the guidance of development of academic staff in IMI-BAN.

There is only one candidate for the position of “Associate Professor” at IMI-BAN

*Tihomir Ilchev Valchev, PhD,*

who is currently holds the position Head Assistant Professor at IMI-BAN, Sofia.

All documents, required according to the guidance of development of academic staff in IMI-BAN, were presented as part of the application of T. Valchev, PhD, for the position.

## **1. Description of Applicant's documents**

The candidate Head Assistant Professor T. Valchev, PhD, is presented in the competition with 15 papers, of which 7 are with only one author. All publications are directly related to the professional field 4.5 Mathematics, scientific specialty Equations of Mathematical Physics. All papers were published after 2010 year after his defense of Thesis for PhD. Unfortunately, there is no information about his participation in the competition for Head Assistant Professor since 2015 at IMI-BAS and for the candidate's publications in this completion. But due to the lack of this information, I have to accept that all 15 papers have not been used in other competitions for academic positions and they are subject to review.

## **2. General characteristics of the applicant's scientific activity**

The research activities of Head Assist. Prof. T. Vachev, PhD, are mainly in the field of Partial Differential Equations and their applications in Physics. He is interested particularly interested in systems of two independent variables that are integrable in terms of the method of the inverse scattering problem.

I'll provide a table to illustrate the formal reference to the minimum scientific requirements of with the law for development of academic staff in the Republic of Bulgaria (LDASRB) and complies with the rules for the implementation of the LDASRB for the academic position of "Associate Professor" under the professional field 4.5. Mathematics IMI and all relevant points of the candidate:

Group	Min. number of points for “Assoc. Prof.” at IMI	Points of the candidate
A	50	50
B	100	100
Г	220	254
Д	70	153
E	20	64

From the table it could be seen the candidate’s points are almost equal to the minimum requirements. Also, he has at least 5 paper published in journals with impact factor which is required in the guidance of development of academic staff in IMI-BAN.

In this Table there are some parts with inaccuracy and mistaken information. I’ll give detailed explanations of them:

➤ In group G the candidate presents 11 papers and more than the half of them (6 papers) are published in Proceedings at Conferences mainly in Bulgaria. According to me it is not a good international distribution of the scientific results of the candidate. In addition, in this group, the applicant reports papers which are reviewed in the Zentralblatt fur Mathematik. But he did not provide the Rev. No.s in the corresponding database would. Similar is the situation in the papers in group D.

➤ In group D candidate’s points are more than twice higher the required minimal ones. These points are connected with the citations. T. Valchev, is presented 28 citations. The main citations are done by A. Yanovski (9 times), and V.S. Gerdjikov (7 times), who are co-authors of the candidate in another papers. The candidate results’ are cited in only 7 papers authored by international Mathematicians. Also, the data base MathSciNet is written incorrectly with small letters.

➤ About group E I have some complains:

1. Project № DN 02/5 from 17.12.2016, titled „Algebraic and geometric methods in differential equations: integrability and nonintegrability”, has a leader prof. E. Horozov, who is changed by Head Assist. Prof. T. Valchev one year before the end of the project. In connection with this it is absolutely incorrectly to be reported the whole amount of the project, 120,000 BGL as an amount used by the candidate T. Valchev.

2. In point 15 as a participation at international scientific and teaching project is reported a postdoc program „Irish research council postdoctoral research project, „Multicomponent nonlinear evolution related to homogeneous and symmetric spaces and their types of solutions”. It is more close to a scholarship than to a participation in a Scientific Project.

The mistaken and incorrectly presented data make a bad impression on the candidate for Associate Professor.

I will make a brief overview of the candidate's research, which I will divide into the following two main groups:

**The first main group** is also abbreviated by the candidate "**Equations of magnetic type**". This group includes the research published in the main papers in the Competition, namely publications [1-6] and [12-15]. Multicomponent nonlinear evolution equations have been studied, in which singularities of solutions are studied by means of obtained asymptotic formulas. The main goal is to construct and study 1 + 1-dimensional nonlinear evolution equations that are integrable in

the sense of the method of the inverse scattering problem. Various types of nonlinear evolution equations have been studied, such as those that have a scattering operator depending linearly on the spectral parameter, or what have a Lax's representation of the type of rational beam, again connected to Hermitian symmetric spaces.

*The second group*, refers to the results published in three papers [7], [10] and [11]. The main contribution in these papers consists of the developed formalism of the real problem of scattering under zero boundary conditions, which underlies all considerations..

There are also two papers, presented in the competition, the research in which is somehow single and cannot be assigned to any of the above groups. This is the article [9], which discusses a possible generalization of the concept of reduction in the sense of Mihailov. Local reductions of this type are described using an end group known as a reduction group. Also a single article is [8], which is essentially a report of the NTADES'15 conference. It also presents an approach for constructing solutions of quasi-rational type for multicomponent integrable nonlinear evolution equations.

### **3. Reflection of the candidate's scientific publications in the literature (known citations)**

The scientific results of T. Valchev, PhD, are totally cited 28 times according to the presented materials. More than half of them, 16 times, are from his co-authors of other papers (so, they are not self-citations). The candidate has a h-index=7 (according to Scopus). From the first point of view, it indicates the significance and international recognition of the results obtained by Dr. T. Valchev. But if we analyze these citations we could see, that most of them (16 papers) are in the papers authored by his coauthors. Only 7 papers authored by international Mathematicians cited the candidate's work.

### **4. Remarks and suggestions**

Most of my remarks and suggestions I wrote above in the detailed explanation of the candidate's scientific activities.

Additionally, I would like to mention that there are several inaccuracies in the documents. For example, in the list of Projects, created in February, 2021, it is written that the Project DN-02-5 from 2016 is active, which is not true.

As an overall, the candidate has enough number of published papers but the incorrectness in the documents makes a bad impression.

Taking in mind the written above I would like to suggest to T. Valchev, Ph.D., not only to continue deeply investigation of the properties of the studying problems, but also to present them at different International Conferences abroad, to try by an active teaching to find young researchers in his field.

### **Conclusion:**

Documents on the competition of Head Assist. Prof. Tihomir I. Valchev, PhD, contain enough number of scientific publications. In the publications of the candidate there are original scientific results and applications, which are internationally recognized. There is no doubt of the scientific abilities and lecturing qualification of Tihomir I. Valchev, PhD. All documents are in accordance with the law for development of academic staff in the Republic of Bulgaria (LDASRB) and complies with the rules for the implementation of the LDASRB, and the guidance of development of academic staff in IMI-BAN.

The candidate is obtained scientific results in an attractive theoretical area, which are cited enough times.

The critical remarks written above, the careless attitude in filling in the documents, the incorrect data, the type of citations, the lack of teaching activity and training of young followers-Mathematicians, give me grounds to give a **NEGATIVE ASSESSMENT and NOT to recommend** to the Scientific Jury to propose to the Scientific Council of IMI-BAS for the election of the applicant Tihomir Ilchev Valchev, PhD for the academic position “Associate Professor” at IMI on Research area 4. Natural Sciences, Mathematics and Informatics, Professional field 4.5. Mathematics, Scientific Specialty Equations of Mathematical Physics.

13/04/ 2021 г.

Reviewer:

/Prof. DSi Snezhana Hristeva-Kraeva/