

**REPORT**  
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**at the competition for the occupation of the academic position of “Professor” in  
in the area 4 Natural sciences, mathematics and informatics, professional field  
4.5. Mathematics, scientific specialty Mathematical Analysis for the needs of  
the Faculty of Mathematics and Informatics at  
“Bishop Konstantin Preslavski” University of Shumen,  
announced in SG No. 55/12.07.2019**

I present my opinion on the competition for selection of academic position “Professor” for the needs of the Faculty of Mathematics and Informatics, University of Shumen “Bishop Konstantin Preslavski” (SHU) in the area 4. Natural sciences, mathematics and informatics, professional field 4.5. Mathematics, specialty Mathematical analysis. The Academic board of the competition is determined in accordance with the Order RD-16-09 / 11.09.2019 of the Rector of the University of Shumen. According to the Protocol 1 of the Academic board of September 17, 2019, I have been selected as author of the report on the competition. The only candidate for the competition is .Assoc. prof. D.Sc. Sevjan Ahmedov Hakkaev. It was presented a set of documents, which is in accordance with the Regulations for the development of the academic staff at the University of Shumen and contains 29 materials and documents, described in the “APPLICATION”, including:

1. Professional CV;
2. Higher education diploma;
3. Diploma for educational and scientific degree PhD “Doctor”;
4. Diploma for the degree of D.Sc. “Doctor of Sciences”;
5. Certificate of acquired academic title “Associate Professor”;
6. List of publications, together with the publications;
7. Reference to citations;
8. Reference to additional indicators;
9. Information for fulfillment of the minimum national requirements under Art. 2 b, par. 2 and 3 of the ZRRAB;

10. Reference to original scientific contributions with relevant evidence;
11. Abstracts;
12. Declaration of authorship.

### **1. General information on the applicant**

According to the presented CV, Sevjan Ahmedov Hakkaev studied Mathematics at the University of Shumen, Faculty of Mathematics and Informatics during 1989-1993. He was a PhD student during 1998-2002. He defended his dissertation for a Ph.D. in 2010. He has been an Associate professor since 2007 at the University of Shumen. He lectured on the subjects Mathematical Analysis I, II, III and IV, Complex Analysis, Ordinary Differential Equations, Functional Analysis, General Topology. These facts show the diverse teaching activity of Assoc. prof. Sevjan Hakkaev. Lists of 4 participations in research conferences, 3 research contracts, 3 positions abroad and a list of 34 articles are enclosed in the Professional CV.

### **2. General description of the materials presented**

A "Contribution reference" and "Minimum requirements" are presented, which provides one textbook [1.1] and 12 articles in journals with Impact Factor (IF) (7 - Q1, 4 - Q2 and 1 - Q3). I accept the articles with numbers [1] - [12] and the textbook for a review. They have been annexed to the Articles folder and have been published since 2011. A declaration is presented that they do not duplicate publications for the degrees Doctor, Doctor of Science and Associate Professor. According to the Citation Reference, a complete list of 87 citations in international journals is presented. According to the Rules for the Implementation of the ZRASRB, SG. 15 / 19. 02. 2019, in the "Minimum requirements" are presented 74 citations, which carry 576 points for the candidate.

### **3. General characteristics of the applicant's scientific, teaching and applications activities.**

As noted above, 12 research articles and one textbook were presented for participation in the competition. The research activity of Assoc. prof. D.Sc. Sevjan Hakkaev is in the field of nonlinear differential equations in the following directions:

1. Correctness and stability of solutions of model differential equations;
2. Stability of solutions of traveling wave type to classes of differential equations of Mathematical physics.
3. Periodic solutions of the type of traveling waves of Ostrovsky equations.

In Direction 1 are the publications [1-3]. They refer to Cauchy's problem for the Benney system of interacting waves and the well and ill posedness of the problem; non uniform continuity of solutions of the family of Holm-Staley equations and stability of solutions of the quadratic and cubic Schrödinger equation.

In Direction 2 are the publications [4-9] and [12]. The orbital stability of periodic waves of the Klein-Gordon-Zakharov system, the nonlinear Schrödinger equation, the spectral stability of traveling waves of the Boussinesq system, and the Klein-Gordon equation are considered. Periodic standing waves of the Schrödinger system and the stability of solutions of stationary equations by the Lugiato-Lefever model are investigated.

In Direction 3 are the publications [10] and [11]. Solutions of the type of traveling waves of the Ostrovski type equations and the spectral stability of their periodic solutions are investigated.

A textbook on Ordinary Differential Equations (ODE's) is also presented. It is intended for Distance Learning on ODE's for students from different specialties at the University of Shumen. Methods for solving standard ODE's classes are discussed, basic theorems, linear systems, phase portraits and Lyapunov stability. There are additions to Mathematical Analysis and Linear Algebra. The style of presentation in some places can be improved.

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

##### **Numerals – quotes**

According to the Scopus information system for Hakkaev, Sevdzhan A., (Author ID: 8676665900) has 27 referred articles with 158 citations in 135 documents. He has H-index of 7. The most cited is the article:

Hakkaev, S., Kirchev, K., Local well-posedness and orbital stability of solitary wave solutions for the generalized Camassa-Holm equation, Communications in Partial Differential Equations Volume 30, Issue 4-6, 2005, Pages 761-781 with 35 citations.

According to Web of Science, Assoc. Prof. Sevjan Hakkaev has 27 articles referred, H-index 6, 142 citations in 124 articles, 124 of which are without citations. The most cited is the article cited above with 33 citations.

All 13 publications submitted are co-authored. I suppose so that in the joint publications, the authors' contribution is equal.

Assoc. prof. Sevjan Hakkaev satisfies all the indicators for the academic position of "Professor" according to the ZRASRB, SG. 15 of 19.02.2019, as follows:

Group of Indicators	Contents	Minimal points for a.d.Professor	Points
A	Indicator 1	50	50
B	Indicator 2	100	100
C	Indicator 3 or 4	100	125
D	Sum of indicators from 5 to 10	220	585
E	Indicator 11	140	576
F	Sum of indicators from 12 to the end	150	128

#### 5. Critical notes and recommendations

I have no significant critical comments on the submitted materials and documents for the competition. As was noted above, the style and manner of presentation of the results can be improved. The author's reference can give more details about the research methods applied.

#### 6. The reviewer's personal impressions of the applicant

I know Sevjan Hakkaev from his presentations and participation in seminars and accreditation procedures. My personal impressions are very good.

#### Conclusion

From the analysis of the submitted materials for the competition, I present to the Board the following conclusion and suggestion:

The presented materials and articles are original and with lack of plagiarism. I have a positive opinion on the competition for the academic degree Professor. The candidate has a research and teaching activity which is in the scientific specialty **Mathematical Analysis**. I recommend to the Academic board to propose to the Scientific Council of FMI - University of Shumen to award to Assoc. prof. D. Sc. Sevjan Hakkaev the academic degree Professor in the professional field 4.5. Mathematics.

Reviewer:   
Prof. D.Sc. Stepan Tersian

03. 10. 2019