OPINION

In regards with Academic position application of PROFESSOR in:
The field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.5 Mathematics,
Specialty "Numerical Analysis",
Announced in Official Gazette No. 50 of 15.06.2021 for the needs of
Technical University of Gabrovo,
Department of Mathematics, Informatics and Natural Sciences

<u>**Applicant**</u>: Assoc. Professor PhD Todor Dimitrov Todorov
<u>**Author of the statement**</u>: Assoc. Professor Doctor of Sciences Milena Radoslavova Racheva

1. General description of the application materials

Only one candidate participated in the announced application process, Assoc. Prof. PhD Todor Dimitrov

Todorov, who works on a basic contract in the Department of Mathematics, Informatics and Natural Sciences at the Technical University of Gabrovo and is currently its head.

34 papers have been submitted, 7 of which replace a habilitation thesis through scientific publications in journals that are refereed and indexed in world-known databases of scientific information. Nine of the articles are single-authored and the rest have one or more co-authors. In addition, the candidate has submitted all his publications with which he has participated in two previous procedures - for obtaining the PhD degree and for holding the academic position of Associate Professor.

In the application process Assoc. Prof. Todorov also participated with 4 textbooks intended for students of the Bachelor's degree in the field of technical sciences. The application materials contain detailed lists of publications and systematized information about the long-standing scientific and teaching activity of Assoc. Todorov.

2. Overview and contributions of the scientific results

The publications taking place in this application procedure have a wide scope and predominantly address one fundamental aspect of the finite element method (FEM): how to most conveniently and rationally discretize the domain in which the model problem is defined, in order to more accurately and computationally easily obtain an approximate solution. The papers presented go further by considering domains of dimension $n \geq 3$.

The most basic and significant - in my opinion - contributions of the publications submitted to the application are:

✠ Conforming coupling of hypercubic and simplicial elements. The former are used in the interior of the domain, while the latter are designed to provide better approximation in the boundary layer [A49, A55, A60, A61]. Although non-conformity also plays a role in modern methods, it is here that I should emphasize that the scientific path of Todor Todorov is closely related to "unavoidable nonconformity" through isoparametrics in FEM (for example [A7, A11, A12, A18, A28, A29]);

✠ Constructing hybrid grids with interface elements is one important approach for modern engineering research tasks. They require overcoming serious difficulties such as ensuring conforming coupling as well as a compactification strategy that gives rise to as few similarity classes as possible [A32, A36, A62];

✠ In the spirit of the above, the methods for calculating the resultant system play an important role. Here we study the cosine of the abstract angle between finite element spaces generated by two subsequent triangulations [A26, A27, A53, A62].

In conclusion, I can responsibly state that in the field of finite element discretization and analysis of the obtained grids and finite element domain Assoc. T. Todorov is a world-class scientist.

3. Tutorial and pedagogical activities

Associate Professor Todorov has extensive teaching experience and about 35 years of teaching activity dedicated to mathematics. He has given lectures, seminars and laboratory exercises in all mathematical disciplines in all faculties of the Technical University of Gabrovo.

He is a supervisor of a successfully defended PhD.

Todor Todorov has presented 4 textbooks in the application, where he is the only author. They cover the material of mathematics studied in technical universities and higher schools in Bulgaria. The material presented is adapted to the needs of the training of students in technical sciences, while not retreating from the mathematical rigor and correctness of formulations, definitions and proofs. The many solved examples and problems supporting and illustrating the theory are well chosen and I personally enjoy using them. In my observation, Assoc. Todorov's textbooks are actively used by students at the Technical University of Gabrovo.

Assoc. Prof. Todorov has been the head of the mathematics team for student competitions and Olympiads for many years. He puts a lot of strength, time and enthusiasm into the preparation of the team. As a result of his work, his graduates have won a number of prizes and awards. As a

consequence of this aspect of Assoc. Todorov we could point out the textbook "Competitive Mathematics".

4. Reflection of scientific publications

There are 68 citations noted on submitted publications not included in previous procedures. Most of the citations are in reputable journals with high impact factor, with the main contribution coming from [A18] with 53 citations.

5. Critical comments and recommendations

I have no significant critical remarks on the scientific and teaching activities of the candidate. I believe that the information in the documents and materials submitted for the competition is unnecessarily voluminous. The numbering (at least for me) is strange and leads to some difficulties in reviewing the competition materials.

6. Personal impressions of the candidate

I know very well the candidate for the academic position "Professor" – for more than 30 years. At the beginning of our professional development we were connected not only by the work in the same department, but also by a common scientific supervisor. That is why my detailed acquaintance with the overall previous activity of Assoc. Prof. Todor Todorov, systematically presented, is more than pleasant and satisfying.

I have the impression and am of the opinion that he is a specialist with a broad mathematical knowledge, impressive efficiency, purposefulness and accuracy. He is proficient in both mathematical theory and the appropriate applied tools (computer algebra systems). In his recent capacity as Head of Department, he has also shown good managerial and decision-making skills.

7. Conclusion

I hereby declare that the materials submitted for the application process fully comply with the requirements of the Law of the Republic of Bulgaria regarding the Acquisition of Scientific Degrees and Academic Positions at the Technical University of Gabrovo.

In view of the above, I propose that Assoc. Prof. Todor Dimitrov Todorov **be elected** as a "Professor" at the Faculty of Economics, Department of MISP of the Technical University of Gabrovo in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.5 Mathematics, specialty "Numerical Analysis".

28.10.2021   Signature: /signature/

Gabrovo   /Assoc. Prof. D.Sc. Milena Racheva/