REVIEW

Competition for the academic position Professor
in the professional field 4 Natural Sciences, Mathematica and Informatics,
professional direction 4.5 Mathematics,
scientific specialty Algebra (non-commutative rings and algebras),
Institute of Mathematics and Informatics, BAS
announced in State Gazette No. 89/11.08.2023

Prepared by Prof. Dr.Math.Sci. Peter Boyvalenkov

1. Competition information. The competition is announced by IMI-BAS in State Gazete on 11.08.2023. Within the deadline, documents are submitted by one candidate – Peter Vasilev Danchev, associate professor in IMI-BAS. The set of documents presented by the only candidate is complete. The Scientific Jury for the competition is voted by the Scientific council of IMI and appointed with order 466/10.10.2023 of the Director of IMI.

2. Candidate information. Peter Danchev has completed secondary education in 1989 in OMG Plovdiv and higher education (MS) in 1995 in FMI of Plovdiv University, specialization Algebra and number theory. He has defended PhD dissertation in professional area 4.5 (Mathematics) in scientific specialty Algebra and number theory in IMI-BAS in 2018 and Doctor of Sciences dissertation in the same specialty in IMI-BAS in 2020. Since 2018 he works in IMI-BAS consecutively as assistant, chief assistant, and associate professor since April 2021, before this he has worked in TU Sofia, NUTI, 120 SOU, and others.

3. General description of the presented papers. The candidate presents 15 papers for the competition, all of them published in the period 2019-2024. From these papers, 8 are in specialized international journals with impact factor and 7 are in journal with SJR (without impact factor). None of these works was used in the previous of the candidate (for chief assistant, associate professor and in the defense of doctor of Sciences dissertation) divided into two groups – 17 main and 6 additional. I confirm the conclusion from the first Jury meeting that the minimum national requirements and minimum requirements of IMI-BAS are completed and accept for evaluation all presented 15 papers.

4. Scientific contributions. The scientific interests of Peter Danchev are in Algebra, more concretely in Ring theory and related areas. The papers, presented for the competition, concern several important areas which will be

considered separately, as for referencing the papers of Danchev I will use the numbering from the List of publications for the competition.

The papers [2,3,4,7,11,12] are devoted to a classical algebraic problem – representation of elements (matrices) of matrix rings as sum of two elements of given properties and some important results are obtained. In [11,12] it is proved that every square matrix over an infinite field can be represented as a sum of a diagonalizable matrix and a nilpotent matrix of order at most two (such representation do not always exist in the case of a finite field), while every nilpotent matrix can be represented as a sum of a potent matrix and a matrix with a zero square (this improves on a result from [3]). In [7], matrix rings over algebraic closure of a finite prime field are considered as it is shown when a square matrix over an infinite field can be represented as a sum of a periodic matrix and a nilpotent matrix of order 2. It is proved in [4] that every square matrix over a field is a difference of two idempotent matrices.

In the papers [5,9] generalizations of the classical Jacobson theorem (if for every element x∈R there exists a positive integer n>1 such that x^n=x, then R is commutative) are considered. It is proved in [5] that the ring R is commutative if for every element x∈R there are two positive integers m and n of opposite parity such that x^m=x^n. In [9] different approaches for proving commutativity are considered as Theorem 2.5 in this paper characterizes polynomial identities which imply commutativity.

The papers [6,13,14] are devoted to questions related to π-uu-rings, as in [6,14] these rings are characterized in relation with other kinds of rings – periodic and rings with an involution. It is proved that a ring with an involution is a π-regular if and only if the corresponding ring is π-regular and for the nilpotent elements of or for the Jacobson radical an additional condition is satisfied.

In the paper [10] n-generalized commutators in rings are investigated and it is proved that if R is a non-commutative simple ring and n>2, the every n-generalied Lie ideal in R contains a nonzero ideal.

In the papers [1,14,15] questions related to π-regular rings are considered. Generalization of this concept is proposed and relations to other classes if rings are considered.

In conclusion for this part I will remark that the author's summary presents correctly, although quite concise, the candidate acviements.

5. Approbation of the scientific contributions. The candidate has presented a list of 9 independent citations of papers used in the competition and

20 other independent citations. Scopus reference shows 137 independent citations and h-index 6. These numbers show that the community in the field accepts well the work of the candidate. On the other hand, I would like to see more active participation of Danchev in conferences via talks and work with university and PhD students. It is not that common to see a mathematician with such high productivity not to have defended PhD students.

The authorship of the publications is as follows: 7 are single-authored, in 6 there is one co-author, and in 2 there are two co-authors. In my opinion, the contribution of Danchev is equal to the contributions of the corresponding co-authors. I have not found signs of plagiarism or autoplagiarism.

My personal impressions from the work of Peter Danchev are excellent taking into account the above remarks. He has proved himself in IMI-BAS as strongly involved in his research and will be definitely very useful as a professor.

6. Teaching and project participation. Teaching activities are not shown in the documents of the candidate. Danchev's participation in projects is enough to cover the minimal requirements but it could be more active, for example in projects with the Bulgarian NSF.

7. Conclusion. Based on the documents presented by the candidate and described above as well as the fact that they fulfill the minimal national requirements and these of IMI-BAS for the academic position „Professor" in scientific area 4. „Natural sciences, mathematics and informatics", professional area 4.5 „Mathematics", **I propose Peter Vasilev Danchev to be elected for the academic position „Professor"** in this area, with scientific specialty Algebra and number theory (non-commutative rings and algebras).

Sofia, 15.11.2023 г.   Signature:

Prof. DrSci Peter Boyvalenkov