

O P I N I O N

by **prof. Nikolay Ivanov Yankov, DSc**

on the competition for acquiring the academic position „**professor**”
in professional field: 4. Natural sciences, mathematics and informatics, professional
area: **4.5. Mathematics**, scientific speciality: **Algebra and number theory**
(Noncommutative rings and algebras)
published in State Gazette No 69 from 11.08.2023
for Institute of Mathematics and Informatics - BAS (IMI),
department „Algebra and logic”,
with only candidate **Assoc. Prof. DSc. Peter Vassilev Danchev**

1. General presentation of the received materials in accordance to art. 60–61(1) of RALDASRB

By order 466/10.10.2023 from the IMI’s director, I was appointed as a member of the scientific jury, and at its first meeting on 18.10.2022, I was selected to write this opinion. All candidate’s documents have been sent to me electronically by email.

In accordance to art. 61, para. 1 of RALDASRB (Rules on the application of the Law for the development of the academic staff in the Republic of Bulgaria), the assessment of the applicant for the academic position ”professor” is done by art. 61 and the results from the reference in accordance to art. 60, para. 3 from RALDASRB. In connection with the implementation of art. 61, on the basis of the documents submitted, it was established:

- a copy of diploma No 998 issued on 16.03.2018 for the educational and scientific doctoral degree „PhD” (satisfying art. 60, para. 1, item 1);
- a copy of a diploma from 16.05.2021 for the academic position of „associate professor”, moreover a register entry in the Bulgarian registry of academic staff in the National Centre for Information and Documentation (NACID) shows that the candidate has been hired as an „associate professor” with the IMI director’s order 173/16.04.2021 thus having at least two academic years of experience in a research institution (satisfying art. 60, para. 1, item 2);
- a copy of a diploma No 1280 from 01.09.2020 awarding the candidate with the scientific degree of „doctor of science” in professional area 4.5. Mathematics. The dissertation titled „Some classes of noncommutative rings and abelian groups” is exactly in the professional area of this competition;

- a reference list for meeting the minimal national requirement in accordance art. 2b, para. 2 and 3 of LDASRB as well as a reference for the original scientific contributions that are backed by evidence (satisfying art. 60, para. 3);
- a declaration of authorship on the scientific works for this competition (satisfying art. 60, para. 3, item 6).

2. General characteristics of the applicant’s scientific activity and contributions

For participation in this competition assoc. prof. Peter Danchev has listed a total of 15 published works not used for his both doctoral theses and for the AP of „associate professor”. All in all, these published works amount to a total of 196 pages.

All articles presented have been referenced and indexed in world-renowned databases or databases of scientific information. Overall 9 papers have impact-factor of them: 4 in quartile Q2, 3 in Q3 and 2 in Q4. The total IF is 8.33, and the average IF is 0.93. Of the rest 6 papers have impact-rank (SJR) with a total rank 1.54. A good impression is made by the fact that all of the papers are in journals entered the WOS/Scopus databases in the category „mathematics”, which shows the exact correspondence of the candidate’s scientific activity with the competition’s professional area. The candidate’s scientific works, which are submitted for this competition, can be grouped as follows:

- Regular and π -regular rings (papers [1], [14], and [15]). A characterization of regular and nil clean rings is shown, and a connection with nil clean ring is established. The candidate proves the important result that π -regular rings are regular nil clean but the reverse is not true.
- Generalizations of classical results ([5] and [9]): Jacobson’s commutativity theorem for potent rings and algebras is extended to a periodic ring whose elements have equal degrees of opposite parity. An algorithm for the commutativity of rings and algebras, that terminates after finite number of steps, is shown;
- Representation of random or nilpotent square matrices over algebraically closed or finite fields into a sum ([2], [3], [4], and [7]). It is proved that every square matrix is the sum of two matrices: a periodic matrix and a nilpotent matrix of a special type. Various algebraic methods were used in the proofs.
- In [6] and [13], a necessary and sufficient condition for a ring to be periodic in terms of invertible elements combined with π -regular elements was derived. The so-called $*$ -periodic rings were examined and their independence from periodic rings was established. Results have been obtained describing the structure of weakly invo-clean rings having weak involution.

- The decomposition of matrices into a sum of potent or diagonal/diagonalizable matrices with nilpotent matrices of order ≤ 2 , is presented in [11] and [12]. For classes of finite commutative rings, it is shown that there is a more suitable expression of a matrix as the sum of a diagnosable matrix and a nilpotent matrix.

I accept all formulated original scientific and applied-scientific contributions of the applicant indicated in the attached form. I am not aware of plagiarism in the works presented.

3. Fulfillment of minimum national requirements

I accept the candidate's list of points to the minimal national requirements:

- Group B: 7 scientific papers in journals having impact-rank for a total of 140 pts. (the required minimum is 100 pts.).
- Group G: 274 points from 8 scientific articles (the required minimum is 200 pts.).
- Group D: 28 citations in WOS and Scopus (I accept 26 of the citations) totaling 159 pts. (the required minimum is 100 pts.).
- Group E: the „doctor of science” degree equaling 75 pts.; participation in 3 national scientific or educational projects, 3 participation in an international scientific or educational project; a total of 165 pts (100 pts. being the minimum).

The specific requirements of the BAS for professional area 4.5 Mathematics are higher than those in RALDASRB, but the candidate also meets those criteria in all groups of indicators.

4. Evaluation of the candidate's personal contribution, other activities

Of the publications submitted for this competition almost half are candidate's sole work. Of the other publications, 2 have 3 authors and 6 have 2. In co-authored works, Prof. Danchev is the first author in 3 and second in the remaining 5.

The search in Web of Science and Scopus shows Prof. Danchev's h-index as 7. The average number of citations per work is 1.2, which is a relatively low indicator. I cannot say anything about the dissemination of the candidate's results, because a list of participation in scientific forums is not provided.

Project activity is positive, including participation in 3 international and 3 national projects.

5. Critical notes and recommendations

More effort could have been made in the technical preparation of the documents for this competition.

Two of the citations included in the citation list are from a 2024 article for which no information is available online. It would be better to omit submitting incorrect lists of total citations in different databases where auto-citations cannot be filtered.

I recommend to Prof. Danchev in the future to pass on his experience to doctoral students who will successfully defend PhD dissertations.

6. Conclusion

I believe that Assoc. Prof. Petar Danchev is a respected world-class specialist in mathematics and in particular in the theory of non-commutative algebras and rings, as evidenced by his numerous scientific publications and citations by foreign scientists.

All mentioned above, and the fact that the candidate satisfies all requirements of LDASRB, RALDASRB and BAS rules, forms the basis for me to propose Assoc. Prof. Peter Vassilev Danchev to be awarded the academic position „**Professor**” in area: **4.5. Mathematics**, scientific speciality **Algebra and number theory** (Noncommutative rings and algebras).

Shumen, 13.11.2023

Scientific jury member:

/prof. Nikolay Yankov, DSc/