R E V I E W

On the competition for the occupation of academic position "Professor"

In the Scientific field: 4. Natural Sciences, Mathematics and Informatics,

Professional field: 4.5. Mathematics,

Scientific specialty: „Algebra and Number Theory (Noncomutative rings and algebras)

for the needs of the Institute of Mathematics and Informatics, Bulgarian Academy of Sciences, Announced in State Gazette no. 69 / 11.08.2023 г.

I.   General description of the applicant and submitted documents

Only one candidate has submitted documents for the announced competition – Assoc. Prof. Peter Danchev, IMI, BAS. Peter Danchev was born on 23.10.1970. He obtained his secondary education at OMG "Ak". Kiril Popov", and his higher education at PU"Paisiy Hilendarski" in 1996. He received the Doctorate degree in 2018 and the Doctor of Science degree in 2020. In 2018, he became an assistant, in 2020 - head assistant, and since 2020 he is an associate professor at IMI-BAN.

1. Candidate data and documentation

The documents submitted by the candidate fully comply with the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Rules for Implementation of the ADAS in the Republic of Bulgaria (RIADAS in the RB) and the Rules on the Terms and Requirements for Acquisition of Scientific Degrees and Occupation of Academic Positions at Intitute of Mathematics and Informatics. The scientific papers meet the minimum national requirements and those of IMI-BAN for occupying the academic position of "professor" in the scientific field and the professional direction of the competition.

The scientific works presented by the candidate do not repeat those from previous procedures for acquiring a scientific title and academic position.

2. General characteristics of the applicant's scientific work and achievements

The scientific interests of Petar Danchev are in the field of non-commutative rings and algebras, and he is the author of 402 scientific publications. 15 scientific publications are submitted for participation in the competition. The candidate declares that the participation of the co-authors in the presented articles is equal. The articles have a total of 29 citations as follows: 3 articles are cited once, 2 articles are cited twice, and one article (which is not included in the competition publication list) is cited 20 times. The main results obtained in the presented publications are as follows:

It is shown in paper 1 that that π-regular rings are always regular and that there exists a regularly nil ring that is nil-pure but not π-regular.

It is shown in papers 2, 4 and 7 that any square matrix of arbitrary size decomposes as a sum of two matrices, the first of which is a periodic matrix (or under some additional conditions it is a potent matrix) and the second is a nilpotent matrix of special type.

In paper 3 it is proved that every square matrix over an arbitrary infinite field is the sum of a nilpotent matrix of order 2 and a diagonalizable matrix.

Paper 5 summarizes well-known classical results, such as the "Jacobson theorem" for commutativity of potent rings/algebras.

In paper 6, a necessary and sufficient condition when a ring is periodic in terms of invertible elements combined with π-regular elements is found.

In paper 8, a number of results are obtained concerning the full matrix ring as well as its triangular matrix subring.

In article 9, a practically realizable algorithm for commutativity of these two algebraic objects, namely rings and algebras, is given.

Paper 10 investigates the problem of generalized Lie commutators and ideals for arbitrary associative rings.

In paper 11 it was shown that for some classes of finite commutative rings, a more exact decomposition can be obtained as a sum of a potent matrix and a nilpotent matrix of order not exceeding 2.

In paper 12 it is shown that every square matrix over an arbitrary infinite field is always representable as the sum of a diagonalizable matrix and a matrix whose second degree is the zero matrix.

In paper 13, several theorems are obtained that describe the structure of weakly involutive-pure rings that possess weak involution.

Paper 14 summarizes various well-known results by Cui-Wang, Cui-Yin and Cui-Danchev, respectively.

In article 15 results in the characterization of the so-called "regular nil-pure rings" are obtained and a connection with the well-known "nil-pure" rings is made.

3. **Characterization and evaluation of teaching activity, work on projects and other activities**

There is no information about the candidate's teaching activities in the submitted documents. The candidate has participated in 2 national projects (Groups and rings – theory and applications from 2019 to 2023 with supervisors Drenski and Chipchakov; Noether's problem for p groups. Finite-dimensional algebras and PI theory. Fields with finite p dimension of Brauer of the Shumen University in 2020 with the supervisor Prof. Ivo Nedyalkov). He is currently a participant in a national project (K-TRIO Researchers in the Knowledge triangle from 2020 to 2024 headed by Prof. Stanislav Harizanov). He participated in two international projects (EBR

with Hungary and University of Andalusia, Spain). He is currently participating in an international project (Trends in Ring and Module Theory funded by TUBITAC).

4. Conclusion on the application

Based on the materials submitted for participation in the competition by Assoc. Prof. Peter Danchev, I believe that his scientific achievements meet the requirements of the ADAS in the Republic of Bulgaria, the Rules for its Implementation and the corresponding Rules of the Institute of Mathematics and Informatics for occupation of the academic position of "professor" in the scientific field and professional direction at the contest. The candidate satisfies the minimum national requirements in the professional field. I give my positive assessment to the application.

II. General conclusion

Based on the above, I strongly recommend that the Scientific Jury propose to the Scientific Council of IMI-BAS to award Assoc. Peter Danchev the title of "Professor" in the field of higher education: 4. Natural Sciences, Mathematics and Informatics, professional field 4.5 Mathematics, scientific specialty "Algebra and number theory" (Noncomutative rings and algebras).

Date: 19.11.2023 г.   Signature:

                                                    (Prof. Emil Kolev)