

REVIEW

by competition for the academic position of "Associate Professor" in field of higher education 4. Natural sciences, mathematics and informatics, professional direction: 4.5. Mathematics, science specialty: Geometry and topology, announced in State Gazette issue 97 / October 21th 2023, with candidates: Chief Assistant Professor Dimitar Rumenov Razpopov, PhD, from Agricultural University, Plovdiv.

Reviewer: Professor Nikola Petkov Zyapkov, PhD, Shumen University " Ep. Konstantin Preslavski", field of higher education 4. Natural sciences, mathematics and informatics, professional direction 4.5. Mathematics, scientific specialty: Algebra and number theory, appointed as a member of the scientific jury by order No. RD-16-43/ January 19th 2024 of the Rector of the Agricultural University, Plovdiv.

1. General data on the career and thematic development of the candidate

Chief Assistant Professor Dimitar Razpopov, is born on December 12th 1973 in Plovdiv. In 1999, he is completed his higher education at the Faculty of Mathematics and Informatics of PU "Paisiy Hilendarski" with a master's degree, major: Mathematics and Informatics. He is defending a doctoral dissertation in professional direction 4.5 Mathematics at PU (2019). The topic of the dissertation is "On the geometry of a Riemannian manifold with two circulant structures" and is in the field of the competition. From 2000 to 2004, he is a teacher of informatics and information technologies for students from 9 to 12 grades. He has been working at AU-Plovdiv since 2004, successively as an assistant, senior assistant and chief assistant. During the period 2019-2023, he also worked as a chief assistant at the University of Food Technology.

2. General description of the presented materials

In the competition for "Associate Professor" Chief Assistant Professor Razpopov participated with a total production of 20 works, grouped as follows:

❖ Scientific publications on the nomenclature specialty - 18 in number, of which:

- Publications related to the doctoral dissertation - 6 in number, which are not subject to consideration;

- Publications with an impact factor – 5 in number;

- Publications in peer-reviewed and refereed scientific journals – 5 in number;
- Publications in conference proceedings – 2 in number;

The personal participation of the candidate in the specified 18 works is illustrated by the fact that his participation in the joint publications is as follows: in 4 - he is the first, in 7 - he is the second, and in the remaining 7 - he is the third and subsequent author.

- ❖ Textbooks – 0 in number.
- ❖ Study guides – 2 in number.

A book is published based on a defended dissertation for the award of the educational and scientific degree "PhD" - 1 in number.

Twelve publications and two study guides are subject to analysis to prepare the review.

To fulfill the requirements for occupying an academic position "Associate Professor" in a professional direction 4.5. Mathematics

Chief Assistant Professor Dimitar Razpopov has submitted a report on the fulfillment of the minimum requirements for occupying the academic position "Associate Professor" in professional direction 4.5. Mathematics.

Indicator A - a diploma for a defended dissertation for the acquisition of the educational and scientific degree "PhD" is presented - 50 points.

Indicator B – 4 publications are presented, which are referenced and indexed in world-famous databases with scientific information (Web of Science and Scopus) - 135 points (minimum requirements - 100 points).

Indicator Γ – 6 publications are presented, which are referenced and indexed in world-renowned databases with scientific information (Web of Science and Scopus) and a published book based on a protected dissertation work for the award of the Educational and Scientific Degree "PhD" - 224 points (minimum requirements - 200 points).

Indicator Д – citations in scientific publications, referenced and indexed in world-famous databases with scientific information (Web of Science and Scopus) are presented - 80 points (minimum requirements - 50 points).

Indicator E – participation in 3 national scientific projects and a published study guides on Higher Mathematics are presented - 35 points.

The total number of points in field 4. Natural sciences, mathematics and informatics, 4.5. Mathematics, of the candidate is 524 with a minimum requirement of 430 points. The candidate has submitted full evidence against all criteria.

Therefore, Chief Assistant Professor Dimitar Razpopov, PhD, meets the minimum requirements of Law on the Development of Academic Staff in the Republic of Bulgaria, Regulations for the implementation of the Law on the Development of Academic Staff in the Republic of Bulgaria and Regulations for the implementation of the Law on the Development of Academic Staff in AU-Plovdiv for occupying the academic position of "Associate Professor" in direction 4.5. Mathematics.

3. Main directions in the candidate's research work

The research work of Chief Assistant Professor Razpopov is in the field of differential geometry and Riemannian manifolds. The directions are as follows:

- differential geometry of smooth three-dimensional manifolds (M, g, q) with additional circulant structure q and Riemannian metric g
- differentiable manifolds with additional structures
- differential geometry of smooth four-dimensional manifolds with additional oblique-circulant structure and Riemannian metric

Chief Assistant Professor Razpopov has participated in two FMI (PU) projects, which are related to the direction of the competition and one interdisciplinary project of the Agricultural University. This shows that the candidate can work in a team and engage in interdisciplinary research.

4. Evaluation of the pedagogical preparation and activity of the candidate. His role in the training of young scientific staff

It can be seen from the presented documents that Chief Assistant Professor Razpopov has 19 years and three months of teaching experience as a teacher in the Department of Mathematics and Informatics at AU-Plovdiv. He has had a large academic workload during the last five academic years. He led lectures and exercises for students in the degree "Bachelor" of AU-Plovdiv in the following academic disciplines: Applied Mathematics, Linear Algebra and Analytic Geometry, Higher Mathematics, Statistics, Biostatistics, Financial Mathematics, Econometrics, Game Theory, Mathematical Analysis. For seven of the listed disciplines, he has prepared lectures and exercises in an electronic environment - Microsoft Teams.

Chief Assistant Professor Razpopov is a co-author of two study guides: Study guides on higher mathematics and Study guides on statistical data processing for doctoral students at AU-Plovdiv.

In total, the horary of guided lectures, exercises and extracurricular activities for the last five academic years is 2801 hours - an average of 560 hours per year.

From the additional materials of Chief Assistant Professor Razpopov, according to the competition, it can be seen that he is the thesis supervisor of 4 graduates who successfully defended their diplomas in the Faculty of Economics of AU-Plovdiv for the period 2018-2020.

The analysis of the pedagogical activity of Chief Assistant Professor Razpopov shows that he has a significant contribution to the education of students from AU-Plovdiv.

5. Significance of the obtained results, proven by citations, publications in prestigious journals, awards, membership in international and national scientific bodies, etc.

The importance for science and practice of the obtained results is confirmed by the fact that five of the articles are published in journals with an impact factor, the overall IF being 3.6. Three of the articles are published in impact-ranked journals, with an overall SJR of 0.74.

Data are presented for 19 citations in journals with an impact factor or impact rank of 9 of the publications.

Chief Assistant Professor Razpopov has participated with reports in 11 international and national scientific conferences, which have contributed to the popularization of his scientific activity.

6. Significance of contributions for science and practice

The main directions in which Chief Assistant Professor Razpopov are in the field of differential geometry and Riemannian manifolds. He is also involved in applied research in agriculture.

I. Scientific contributions

- In the three-dimensional Riemannian manifold M with circulant metric g and circulant structure q , with the third power of q equal to the identity, the components of the curvature tensor R are calculated with respect to the Levi-Civita connectivity for the metric. Properties of sectional curvatures are obtained. An example of such diversity has been found.

- A class of almost Einstein manifolds (M, g, S) and a class of Einstein manifolds (M, g, S) are obtained. Conditions are found under which special orthogonal bases exist in every tangent space of (M, g, S) . Some curvature properties of the considered manifolds are obtained. A necessary and sufficient condition for the structure S to be parallel with respect to the metric g is found. Conditions are obtained for the associated manifold (M, g, J) to be Kellerian. Examples of the considered manifolds on Lie groups are constructed and some of their curvature properties are found.

- The work done by an isotropic force vector field in the direction of an isotropic curve is considered a four-dimensional Riemannian manifold M with metric g and a tensor field Q of type $(1,1)$, whose fourth degree is the identity. Forces whose vectors are in a tangent space of (M, g, Q) are studied. The corresponding physical work done by forces on curves with respect to g is calculated.

- The value of work done by an isotropic force vector field along the direction of an isotropic curve is considered in a three-dimensional differentiable manifold M equipped with a Riemannian metric g and an endomorphism Q whose third degree is the identity and Q acts as an isometry of g . Physical forces are represented by vector fields. Forces whose vectors are in the tangent space TpM of (M, g, Q) are studied. Moreover, these vectors are isotropic and act on isotropic curves. The physical work done by such forces has been studied.

- A two-dimensional differentiable manifold M is considered, provided with a Riemannian metric g and with an almost product structure Q , and the matrices of the coordinates of g and Q are circulant. A necessary and sufficient condition for the parallelism of the structure Q is found. An equation of a circle defined about the adjoint indefinite metric defined using g and Q is obtained. Examples of manifolds (M, Q, g) that are two-dimensional are found surfaces embedded in three-dimensional Euclidean space with a given Cartesian coordinate system $Oxyz$.

II. Applied Contributions

Chief Assistant Professor Razpopov participates in groups that work on research of an applied nature.

- A comparative study of the productive and quality indicators of common wheat varieties in the northeastern region of Bulgaria is made. The field experiment is conducted in the selected area of the village of Pristoe, Shumen region in the period 2017-2019. The results show that the highest grain yield is obtained from the Avenue variety - $790 \text{ kg}/10^{-1} \text{ ha}$, followed by Joker - $740 \text{ kg}/10^{-1} \text{ ha}$ and the lowest - from the Marigold variety $660 \text{ kg}/10^{-1} \text{ ha}$. The highest values of test weight and vitreous content were reported for Calendula (84.7 kg and 89.6%), respectively, the Joker variety showed the best values of the studied technological properties of the grain among the studied wheat varieties.

- A mathematical assessment of the technological approaches for the production of coriander is made. The production technology is evaluated using math, analysis of variance and T-test. The obtained results are adequate and easy to interpret, reflect the entire process and are valid only under specific conditions. It is concluded that the time of sowing affects the yield when growing coriander.

7. Critical notes and recommendations

I have no critical remarks about PhD Razpopov. My recommendation is not to slow down the pace of his work in scientific and educational activities and to publish as an independent author.

8. Personal impressions and opinion of the reviewer

I do not know the candidate, but my impressions of PhD Pazpopov as a scientist and teacher are very good.


CONCLUSION

Based on the analysis of the candidate's pedagogical, scientific and scientific-applied activities, I believe that Chief Assistant Professor Dimitar Razpopov, PhD, meets the requirements of Law on the Development of Academic Staff in the Republic of Bulgaria, Regulations for the implementation of the Law on the Development of Academic Staff in the Republic of Bulgaria and the Regulations of the Agrarian University for its application. The scientific output presented by the candidate, participation in contracts and scientific forums, a good teacher and supervisor of theses gives me reason to **POSITIVELY** evaluate his overall activity.

I take the liberty of proposing to the honorable Scientific Jury to also vote positively, and the Faculty Council of the Faculty of Economics at the Agrarian University - Plovdiv to elect **Chief Assistant Professor Dimitar Rumenov Razpopov, PhD**, as an "Associate Professor" in the scientific specialty **Geometry and Topology**.

Date: 6.02.2024

Plovdiv

REVIEWER: 
(Prof. Nikola Zyapkov, PhD)