

OPINION

in a competition for the academic position "Associate Professor" in the professional field 4.5. Mathematics, scientific specialty Mathematical modeling and application of mathematics for the needs of Trakia University, Stara Zagora

The competition was announced in SG, issue 36 of 14.04.2020 with a candidate:
Chief Assistant Professor Miroslava Teneva Ivanova, PhD
Member of the scientific jury: Prof. Dr. Velizar Todorov Pavlov

1. Brief biographical data of the candidate.

Miroslava Teneva Ivanova graduated from Sofia University "St. Kliment Ohridski", Bachelor's degree, in 2007 by specialty "Applied Mathematics" and ACS "Master", in 2010 in the specialty "Mathematical Modeling in Economics". He received the ONS "Doctor" in 2012 at the University of Plovdiv "Paisii Hilendarski" in the scientific specialty "Geometry and Topology". From 15.06.2016 until now he holds the academic position of "Chief Assistant" at the Trakia University, Stara Zagora.

2. Information about the presented materials.

The candidate Ch. Assistant Professor Dr. Miroslava Ivanova participates in the competition with 11 scientific publications, which can be classified as follows:

by type: all publications are in the form of articles in scientific journals, referenced and indexed in world-famous databases of scientific information.

by relevance: magazine articles:

indexed by Web of Science with impact factor (IF) in Q₁ - 1 number; indexed by Web of Science with image factor (IF) in Q₄ - 3 pieces; indexed by Scopus with impact rank (SJR) - 6 pieces;

indexed by Zentralblatt - 1 piece.

by language of publication: all articles are published in English.

by number of co-authors:

with one co-author - 7 pieces;

with two co-authors - 2 pieces;

with three co-authors - 1 pieces;

with four co-authors - 1 pieces.

3. General characteristics of the research and scientific-applied activity of the candidate. The candidate's work can be structured in the following scientific areas:

3.1. Applications of mathematical methods in geometry. Scientific papers [1], [3] and [10] fall into this direction.

Almost contact B-metric manifolds in which the restriction induces antiisometry with respect to the pseudoriman metric are considered. In [1], a ϕ -canonical natural connection on an almost contact B-metric manifold was introduced and it was proved that there is only one such connection. The class of is defined the manifolds considered.

Group G of general contact conformal transformations of the almost contact B-metric structure is considered. An invariant class of the considered manifolds and an invariant tensor with respect to the group of transformations are determined

G. An appropriate example is constructed for illustration. In [3], three natural connections were considered, which were studied on a family of Lie groups, considered as 5-dimensional almost contact B-metric manifolds. Conditions under which the 5-dimensional Lie groups are flat or have zero scalar curvature are defined and some of their characteristics are determined. In [10], an example of a 3-dimensional almost contact B-metric manifold is considered by constructing a 2-parametric family of real connected Lie groups. It is proved that the obtained variety belongs to the direct sum of two main vertical classes of the Ganchev-Mihova-Gribachev classification.

3.2. **Mathematical modeling in mycology.** Scientific papers [2], [5], [7], [8], [9] and [11] fall into this direction.

Mycology is the science of fungi. It deals with the systematic study of their genetic and biochemical properties, their taxonomy, their use by humans as a source of food, drugs and psychotropic substances, and the risk of poisoning or infection. Heavy metals are among the most dangerous to human health and the environment. The assessment of the risk of heavy metals to human health as a result of mushroom consumption is of particular research interest. In [5] an assessment was made for the safety of human health when consuming wild edible mushrooms. In [8] a mathematical-statistical analysis of macroelements in nine species of wild mushrooms was performed. The accumulation of macronutrients in these fungi was studied by hierarchical cluster analysis. In [2] a linear regression model was constructed, which studies the relationship between iron (Fe) and other heavy metals (Pb, Cd, Co, Cu, Mn and Zn) in the fungus *Suillus luteus*, and in [7] by a similar model the relationship between Histidine (His) and the other essential amino acids (Thr, Met, Val, Leu / Ile, Phe and Lys) in the fungus *Boletus pinophilus* was investigated.

The technology for processing edible mushrooms was studied in [9, 11]. The dynamics of drying of mushroom slices with a thickness of 2 mm in an oven at an air temperature of 35 ° C, 45 ° C and 55 ° C was analyzed. Mathematical models for thin-layer drying have been constructed, which make it possible to determine the drying curve with the lowest cost. A comparative analysis of the obtained models is made.

3.3. **Applications of mathematical methods in chemistry.** It falls in this direction [4].

An interesting application of mathematical methods in quantum chemistry is presented in [4]. The states of multielectron atoms or ions classified by the Russell-Saunders (L-S) schemes and the j-j bonding scheme are described. In [4], using means of Euclidean geometry and linear algebra, p₂, d₂ and f₂ electronic configurations were calculated, for each of which the corresponding number of microstates was determined.

3.4. **Mathematical modeling in finance.** It falls in this direction [6]. The research is based on the modern portfolio theory developed by

Harry Markovic. In [6] an application of the Markowitz model is presented, using historical weekly prices of 50 shares traded on the Bulgarian stock market. Portfolios with minimal risk, with maximum return, with maximum Sharpe index have been

constructed and their limits of efficiency have been determined. The obtained results are especially useful for Bulgarian investors in the process of choosing their own optimal portfolio at a certain risk.

The research activity of the candidate is focused on the applications of various mathematical methods and models in geometry, mycology, chemistry and finance, which is in line with the scientific specialty of the announced competition.

4. Evaluation of scientific contributions. The candidate's contributions have a scientific and scientifically applied character.

I would like to note that Dr. Ivanova participates in the competition with 11 publications, 4 of which are in publications with an impact factor and 6 in those with an impact rank. The highest weight is [1] with $IF = 0.794$ in Q1. All publications are co-authored, and I accept that her personal contribution is equivalent to that of the other co-authors. I define all contributions as original with significance for science and practice. I find no evidence of plagiarism.

In accordance with ZRASRB and PPZRASRB a reference has been prepared by the candidate for fulfillment of the minimum national scientometric requirements for holding the academic position "associate professor" in PN 4.5. Mathematics. After my careful examination I can conclude that all the requirements are met and even exceeded. The presented report shows that Dr. Miroslava Ivanova has the appropriate international recognition.

5. Assessment of the candidate's educational activity. Chief Assistant Professor Dr. M. Ivanova has eight years of teaching experience (since 2012) as an assistant and chief assistant at the Trakia University. Conducts lectures and exercises in Quantitative Methods and Mathematics for students in Business Economics, Mathematics 1 and 2 for students in Agricultural Engineering and Mathematics for students in Ecology and Environmental Protection. She is the author of the academic program in these disciplines. She is the scientific supervisor of two successfully defended graduates.

6. Critical remarks and recommendations.

Presented by Ch. Assistant Professor Dr. M. Ivanova reference for scientific contributions rather resembles the summaries of scientific papers. The presented abstracts of the scientific papers coincide with the abstracts of the respective scientific publications, in which the "Copy-paste" technology is applied. I do not think this approach is a good one. Claims for scientific contributions of the candidate should be formulated in a more synthesized and precise form. I recommend to Dr. Ivanova in her future educational activity to put emphasis in the direction of preparation and publication of educational literature for the needs of the Trakia University.

7. Conclusion.

Based on the presented scientific papers, their significance, the scientific and scientific-applied contributions contained in them, having in mind the requirements of ZRASRB and the Regulations for its application, I find it reasonable to propose the candidate Ch. Assistant Professor Dr. Miroslava Teneva Ivanova to take the academic position of "ASSOCIATE ASSOCIATE" at the Trakia University, professional field 4.5.

Mathematics, scientific specialty Mathematical modeling and application of mathematics.

Date: 11.08.2020

JURY MEMBER:.....
/Prof. Dr. Velizar Pavlov/