

# STATEMENT REPORT

**On the competition for the academic position of “Professor”**

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

**Professional field: 4.6. Informatics and Computer Science,**

**Scientific specialty: Informatics (Data security, Internet of things),**

**For the needs of the Institute of Mathematics and Informatics, BAS,**

**Competition announced in**

**State Gazette No. 65/02.08.2024 and the internet site of IMI, BAS**

This statement report has been prepared by **Professor Maya Miteva Stoyanova, Ph.D.**, Department of Algebra, Faculty of Mathematics and Informatics, Sofia University “St. Kliment Ohridski”, as a member of the scientific jury for the competition according to Order No. 348 / 01.10.2024 of the Director of the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences.

Documents from one candidate, namely **Associate Professor Hristo Nikolov Kostadinov, Ph.D.**, Department of Mathematical Foundations of Informatics, Institute of Mathematics and Informatics (IMI), Bulgarian Academy of Sciences (BAS), were submitted in time for participation in the announced competition.

## **1. Data on the applicant and submitted documents**

Hristo Nikolov Kostadinov obtained a Master's degree in mathematics, specialization Coding theory, at the Faculty of Mathematics and Informatics of Sofia University “St. Kliment Ohridski” in 2001. In the period of 2002 - 2005 is a Ph.D. student at the University of Electro-Communications in Tokyo, where he defended a doctoral thesis for the Ph.D. degree in professional field 4.6. Informatics and Computer Science as a result in 2005. After returning to Bulgaria, he worked in the Department MFI of the Institute of Mathematics and Informatics at the BAS successively as a mathematician, chief assistant, and since 2012 holds the academic position of “Associate professor”.

Assoc. Dr. Hristo Kostadinov is a member of the Bulgarian section of the Society for Industrial and Applied Mathematics (SIAM), he was a member of the organizing committees of BGSIAM 2019, 2020, 2021, 2022, as well as of Mathematical days in Sofia 2023.

The documents submitted by the candidate in accordance with the competition comply with the requirements of the Act for the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Regulations on the Implementation of the Development of the Academic Staff in the Republic of Bulgaria Act (RIDASRBA) and the Rules on the Terms and

Requirements for Acquisition of Scientific Degrees and Occupation of Academic Positions of IMI and BAS, respectively. The documents are well structured and formatted. To participate in the competition, the candidate Assoc. Prof. Hristo Nikolov Kostadinov has presented a list of a total of 15 publications in international and national scientific publications and scientific forums. It is clear from the documents presented in this competition that Assoc. Prof. Hristo Nikolov Kostadinov, Ph.D., meets the requirements of Art. 24 of the ADASRB, and Art. 53 of the RIADASRBA for the occupation of the academic position "Professor".

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

The full list of scientific works of Associate Professor Hristo Kostadinov consists of 36 publications. His research interests are in coding theory. Specifically, a series of candidate papers are devoted to the construction of error correction codes and their applications to code modulation, signal processing, steganography, and error detection in flash memories. His other publications are on blockchain and IoT applications. For participation in the current competition 15 scientific publications have been presented, all published in the period from 2013 to 2024. Three of them are referenced and indexed in international scientific publications with an impact factor (IF) and, respectively, in the first quartile (Q1) of Web of Science; nine of the others are publications in scientific journals with an impact rank (SJR) refereed and indexed in Scopus, and the remaining three are refereed in Scopus (two) and zbMATH (one). I confirm that none of the 15 publications submitted for the competition have been used in the previous procedure (for Ph.D.) and competitions (for chief assistant, associate professor), and that there is no plagiarism.

From the report submitted by Assoc. Prof. Hristo Kostadinov on the fulfillment of the minimum national requirements (under Art. 2b, para. (2) and (3) of the ADASRB) and the additional requirements (Art. 2., (2) from the Rules on the Terms and Requirements for Acquisition of Scientific Degrees and Occupation of Academic Positions of the IMI, BAS) under a competition for the academic position of "professor" in Professional field 4.6. Informatics and Computer Science, accompanied by the necessary evidences for verification in the world scientific information databases, shows that the applicant exceeds both the minimal national requirements and the specific ones of the internal regulations of IMI and BAS.

## **3. Detailed analysis of the scientific and applied achievements of the candidate contained in the materials submitted for participation in the competition**

The scientific interests of Assoc. Prof. Hristo Kostadinov, Ph. D., are in the field of Coding theory and the Internet of Things. They are grouped by him in the presented author reference with original scientific contributions in four conditional groups by subject.

The first group of papers presents constructions of codes on a ring of integers modulo  $m$ , as well as their application in flash memories, coded modulation and communication systems.

Following the numbering from the list of publications on the competition presented by the candidate, in articles [1, 5, 12] codes capable of correcting the most common errors that

occur with flash memories have been constructed. For this purpose, codes on a ring of integers modulo  $m$  are used, which are designed to correct a specific type of error.

Articles [2, 3, 4, 13] are related to research on triangular quadrature amplitude modulation (TQAM). The codes constructed in article [14] are designed to correct errors occurring when transmitting information over a noisy binary channel, on which the information is divided into blocks of equal length.

The second group is on Steganography - methods for embedding watermarks in audio files. In this group, only an article [6] was submitted to the competition, which uses appropriate correction codes and parameter selection for embedding compression-resistant watermarks in music audio files.

The third group is dedicated to the application of public blockchain platforms and smart contract platforms based on distributed ledger technologies (DLT). Several possible applications of these platforms are explored in publications [7, 8, 9, 10].

The last fourth group is on the Internet of Things (IoT). This group includes the publications [11,15]. In article [11], a solution for monitoring and controlling carbon emissions from vehicles is proposed. In [15], a new technique for network dynamically distributed interdependent microservices on moving infrastructure nodes, applicable in practice, is presented.

The abstracts of the publications and the summary of the scientific contributions presented by the candidate accurately and clearly reflect the contents and the results of the publications.

#### **4. Approbation of the scientific contributions**

Associate Professor Hristo Kostadinov, Ph.D., has presented 24 citations, included under criterion D in the reference for the fulfillment of the minimum national requirements submitted for the competition. From the profile of Assoc. Prof. Hristo Kostadinov is seen in Scopus as having an h-index of 4. Nine of the candidate's articles presented in the competition are co-authored with N. Manev, one of which was co-authored by L. Krалева. Four of the articles are co-authored by Biser Tsvetkov – Ph.D. student of Assoc. Prof. Kostadinov, and two of them are co-authored with Zh. Zhelyazkov. The other two articles are co-authored by Ts. Tsokov. I believe that the contribution of Assoc. Prof. Hristo Kostadinov in the joint publications is equal to the contributions of the corresponding co-authors. I have no information, and I am convinced that there is no plagiarism or auto-plagiarism. As I already mentioned above, Assoc. Prof. Kostadinov is the supervisor of a successfully defended doctoral student. He participated in 10 scientific projects, of which 3 were international and 7 were national.

#### **5. Personal impressions of the candidate**

I know Hristo N. Kostadinov for many years. Over the years, I have listened many times to his presentations at various scientific forums and I have excellent personal impressions from them, both for his deep scientific knowledge and for his good presentation skills. He was the

secretary of the Department MFI, and is currently the head of the department. Hristo Kostadinov is a hardworking, fair and responsive colleague and scientist.

## **Conclusion**

Having become acquainted with the documents and scientific papers presented in the competition and on the basis of the analysis of their importance and the scientific and applied contributions contained therein, I **confirm** that the scientific achievements meet the requirements of the ADASRB, the Regulations on the Implementation of the Development of the Academic Staff in the Republic of Bulgaria Act (RIDASRBA), and the corresponding Rules of the Bulgarian Academy of Sciences and the Institute of Mathematics and Informatics for the occupation by the candidate of the academic position “Professor” in the scientific field and professional field of the competition. In particular, the applicant meets the minimal national requirements in the professional field and no plagiarism has been detected in the scientific papers submitted for the competition.

I **give my positive opinion** to the application.

On the basis of the above said, I **strongly recommend** to the Scientific Jury of the competition to propose to the Scientific Council of the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences to select Associate Professor Hristo Nikolov Kostadinov, Ph.D., for the academic position “Professor” in professional field 4.6. Informatics and Computer Science, in this area, with scientific specialty Informatics (Data security, Internet of things) to Department MFI, IMI, BAS.

November 17, 2024

Signature: .....

Prof. Maya Stoyanova, Ph.D.