

## OPINION

**for a competition for the acquiring academic position "Associate Professor"  
in a professional field 4.6. Informatics and computer science (Software and hardware  
implementation of models and algorithms for controlling the movement of  
manipulators),  
for the needs of Sofia University "St. Kliment Ohridski" (SU),  
Faculty of Mathematics and Informatics (FMI),  
announced in SG no. 61 / 02.08.2022 and on the FMI and SU websites**

The opinion is prepared by: **Assoc. Prof. Dr Krasimira Minkova Ivanova**, Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences, professional field 4.6. Informatics and computer sciences, as a member of the scientific jury for the competition according to Order No. RD 38-562/28.09.2022 of the Rector of Sofia University.

**Only one candidate** has submitted documents for participation in the announced competition:  
**Doctor Kaloyan Marianov Yovchev**  
Chief Assistant in SU, FMI, Department of Mechatronics, Robotics and Mechanics.

### I. GENERAL DESCRIPTION OF MATERIALS SUBMITTED

#### 1. Application data

The documents submitted by the candidate in the competition correspond to the requirements of the Act on development of the academic staff in the Republic of Bulgaria (ADASRB), the Regulations on the implementation of ADASRB, and the Regulations for the terms and conditions for acquiring scientific degrees and occupying academic positions at SU "St. Kliment Ohridski".

For participation in the competition, the candidate Kaloyan Marianov Yovchev submitted a list of a total of 14 titles, including 3 publications in journals with impact factor (two in category Q3 and one in category Q4), 9 publications in journals with SJR and 2 publications in conference proceedings that are indexed in Scopus, as well as a list of 8 publication citations.

Among the presented documents are a list of all publications (a total of 31 indexed in the scientometric databases) and a list of all citations (a total of 52); copies of the master's and doctor's diplomas; the employment contract and certificate of internship as a chief assistant; sample from the Authors system showing scientific projects in which he participated as a member of an FMI team (12 items) and participation in conferences with reports (20 items); and report on teaching employment over the last 3 years.

The submitted documents are complete. Their extremely precise preparation is impressive, with convenient references to the texts of the publications and indexing in the scientometric databases.

## 2. Applicant data

Kaloyan Yovchev graduated with a master's degree in Informatics, specialty "Mechatronics and Robotics" at SU "St. Kliment Ohridski" in 2015 with full honors, and in 2018 he successfully defended his dissertation on the topic "Iterative learning for manipulative robot control", with which he obtained a PhD in Informatics and Computer Sciences (Information Technologies).

Since 01.10.2019, he has been working as a chief assistant at FMI, Department of "Mechatronics, Robotics and Mechanics" (i.e. he has over 3 years of work experience as a chief assistant). At the same time, he also worked at the Institute of Robotics at the BAS as an IT planning specialist. In the period 2015–2018, he was a member of the Standing Committee on Natural Sciences, Mathematics and Informatics of the NEAA.

## 3. General characteristics of the scientific works and achievements of the candidate

The scientific publications and citations submitted for participation in the competition meet the minimum national requirements (according to Article 2b, Para 2 and 3 of the ADASRB) and, respectively, the additional requirements of SU and FMI for occupying the academic position "Associate Professor" in Professional direction 4.6. They do not repeat publications included in the candidate's doctoral dissertation (reference – the registration of Kaloyan Yovchev in the Register of academic staff and the defended dissertation works of NACID). There is no evidence of plagiarism in the scientific works submitted for the competition.

The scientific interests of Kaloyan Marianov Yovchev are mainly in the field of methods, algorithms and systems for controlling the movement of manipulative robots. The field is extremely modern and rapidly developing. He knows in details the current state of the problems and the proposed solutions. His rich publication activity in established journals and series is impressive. The citation of the results is a sign of the relevance and novelty of the proposed methods and solutions.

## 4. Characteristics and assessment of the candidate's teaching activity

The presented report on classroom and teaching employment is quite general. It can only be concluded that Kaloyan Yovchev's academic workload has been steadily increasing over the last three years. Out of a horary of around 670 hours for the last year, he is sufficiently busy with teaching activities.

## 5. Content analysis of the applicant's scientific and applied scientific achievements contained in the materials for participation in the competition

The contributions of candidate Kaloyan Yovchev are well structured and described in the Reference for Original Scientific Contributions.

The proposed novel iterative learning control method with limited output COILC, which aims to solve the problems of the presence of constraints in the state space and the presence of transient error, represents a **scientific contribution**.

The **applied scientific contributions** stand out:

- A computer simulation of manipulation robots was created for experimental verification of control methods with iterative learning of robots;
- An approach for applying control with iterative learning in the presence of obstacles in the working space of manipulation robots is proposed;
- An approach, offering a combination of computer vision and control with iterative learning for precise positioning of the arm of a manipulative robot to the desired object is proposed;
- An intelligent remote control and communication system for service robots has been developed and implemented in practice;
- A cost-effective hardware and software design for the control of anthropomorphic and additional degrees of freedom robots that perform point-to-point or trajectory motions is proposed;
- The zero-moment method has been investigated and evaluated through a computer simulation of the forward motion of a biped robot with 10 degrees of freedom.

**Applied contributions** relate to the development of learning anthropomorphic mobile service robots; software implementation for the designed robots; development of computer simulations of management and others.

Almost all publications submitted for participation in the competition are collective (except for [6]), and in 6 of the articles he is the first author. Separation protocols were not submitted, so I consider authorship in the collective articles to be equally shared.

#### 6. Critical notes and recommendations

I have no critical remarks about the work of Kaloyan Yovchev.

#### 7. Personal impressions of the candidate

I don't know the candidate, so I have no personal impressions.

#### 8. Conclusion

After observing the materials and scientific works presented in the competition and based on the analysis of their significance and the scientific and applied scientific contributions contained in them, I confirm that the scientific achievements meet the requirements of ADASRB, the Regulations for its application and the relevant Regulations of SU "St. Kliment Ohridski" for the candidate to occupy the academic position of "Associate Professor" in Professional Field 4.6. Informatics and Computer Science. In particular, the candidate satisfies the minimum national requirements in the professional direction and no plagiarism has been found in the scientific works submitted for the competition.

I give my positive assessment for the application.

## II. GENERAL CONCLUSION

Based on the above, **I recommend** the scientific jury to propose to the competent authority for the selection of the Faculty of Mathematics and Informatics at SU "St. Kliment Ohridski" to elect **Dr Kaloyan Marianov Yovchev** to occupy the academic position of "**Associate Professor**" in professional direction **4.6. Informatics and computer science (Software and hardware implementation of models and algorithms for controlling the movement of manipulators)**.

20 October 2022

Sign:

Assoc. Prof. PhD Krassimira Ivanova