<div align="center">**REVIEWER'S OPINION**</div>


<div align="center">**on Competition procedure for the position of "Associate Professor" in the field 4.5
Mathematics (Geometry) Announced by Sofia University St. Kliment Ohridski, Faculty of
Mathematics and Informatics in the State Gazette, issue 21/13.03.2020 and on the Sofia
University St. Kliment Ohridski web page**</div>


By Assoc. Prof. Yulian Tsankov Tsankov, Sofia University St. Kliment Ohridski, Faculty of
Mathematics and Informatics, professional field 4.5 Mathematics (Geometry) in his capacity of
Scientific Jury Member following Order # RD 38-266/10.07.2020 of the Rector of Sofia University St. Kliment Ohridski


For participation in this competition applied only one candidate: **Senior Assistant PhD Alexander Vladimirov Petkov** (Fac. of Mathematics and Informatics – Sofia University "St. Kliment Ohridski").


## I. GENERAL DESCRIPTION OF THE DOCUMENTS PRESENTED FOR THE COPMPETION


### 1. Description of the application

Documents presented at the competition by **Senior Assistant PhD Alexander Petkov**, meet the requirements of the Law for Development of the Academics in the Republic of Bulgaria, Bylaws (Pravilnik) for implementation of the Law for Development of the Academics in the Republic of Bulgaria and at Sofia University St. Kliment Ohridski.

For participation in the competition, **Chief Assistant Professor Alexander Petkov** has presented 6 publications in international scientific journals.

Three of his publications are standalone (numbers 2, 5, 6).


### 2. Data for Applicant

**Chief Assistant Professor Alexander Petkov** graduated in 2010 with a Master's Degree in Geometry from the Faculty of Mathematics and Informatics of Sofia University "St. Kliment Ohridski".

In 2014 he defended his PhD thesis in geometry under the scientific guidance of Prof. D.Sc. Stefan Ivanov.

From 2014 until now, he has been a **Chief Assistant Professor** in the department of Geometry in the Faculty of Mathematics and Informatics of Sofia University "St. Kliment Ohridski ".

In the period 2017-2019 he has scientific specializations in Austria and USA.

In the period 2009 -  2019 **Alexander Petkov** participates in 12 Scientific projects.

### 3.   General characteristic of the scientific works and achievements of the applicant

The scientific results with which Senior Assistant Alexander Petkov applies are in the field of quaternionic contact geometry. Lower estimates of sharp inequality bounding in the sub-Laplacian spectrum have been found at different dimentions. Recently Senior Assistant Alexander Petkov works in the field of Algebraic geometry.

Approbation of the results: **Chief Assistant Professor Alexander Petkov** has presented his results at a series of national seminars and international conferences – in Bulgaria, and abroad - in Belgium, Russia, Serbia, France.

Numerical indicators: According to the Sofia University regulations and the regulations for the Law application on the minimal national criteria for occupation of the academic post "Associate Professor", the required indicators and the indicators for the applicant **Alexander Petkov** are provided in the TABLE below. It is evident that these criteria are satisfied:

| Group | А | В | Г | Д |
|---|---|---|---|---|
| Applicant's points | 50 | 111 | 204 | 64 |
| Minimum points required | 50 | 100 | 200 | 50 |

**a)** The submitted publications are in full compliance with the minimal national requirements under Art. 2B (2) and (3) of ZRASRB, as well as with the additional requirements of SU for the academic position "Professor" in the professional field of this competition;

**b)** None of the submitted publications have been submitted in a preceding procedure for acquiring a scientific title or an academic position;

**c)** There is no lawful evidence for plagiarism in the submitted publications.

### 4.   Characteristic and evaluation of the teaching activities of the applicant

Senior Assistant Alexander Petkov led an exercise at the Department of Geometry of FMI in the disciplines: Differential Geometry, Geometry, Linear Algebra, Analytical Geometry and Mathematics for many specialties in FMI, FHF, GGF. He was a holder of the courses in Analytical Geometry for the specialty Statistics in FMI and Mathematics in the Faculty of Geology and Geography at Sofia University. Regardless of whether Chief Assistant Professor Alexander

Petkov has given lectures or exercises, he has always been sought after and respected by his students because of the way the material is presented, the correctness and accuracy of the grades.

## 5. Analysis of the scientific achievements of the applicant in the works presented on the competition

The submitted scientific works [1-6] present the results calculated by the candidate and his co-writers mainly focused on evaluation of eigenvalue of the sub-Laplacian on a compact quaternionic contact manifold.

The scientific contributions of the candidate in the submitted articles for the competition could be summarized in the following:

A version of Lichnerowicz' theorem giving a lower bound of the eigenvalues of the sub-Laplacian on a compact seven dimensional quaternionic contact manifold is proved

It is proved that on a compact non-locally spherical qc manifold there exists a qc conformal qc structure with constant qc scalar curvature.

An entropy formula for the quaternionic contact (qc) heat equation on a compact qc manifold is derived. Applications to the derived formula are added.

One of the applications establishes a lower bound of the first eigenvalue of the sub-Laplacian on a compact quaternionic contact manifold, provided a Lichnerowicz-type condition.

## 6. Critical Remarks and Recommendations

I have no significant critical remarks towards the candidate and the presented documents.
I recommend the candidate to focus on conducting specialized elective courses in the scientific fields in which he works.

## 7. Personal Impressions

I have known Alexander Petkov personally since he was a student at FMI. In his specialty I taught exercises in differential geometry. He was one of the strongest students on the course. He greatly appreciated, collected and read classic books mostly in the field of mathematics (this is a great rarity for a young person). My impressions of Alexander Petkov as a teacher and colleague are extremely positive.

## 8. Conclusion on the application

Having become acquainted with the materials and the scientific works submitted in the competition and on the basis of the analysis of their significance and the scientific and applied contributions contained there. **I confirm that the scientific achievements meet the requirements** of the ZRASRB, the PPZRASRB and the corresponding Regulations of Sofia University

"St. Kliment Ohridski" for the occupation by the candidate of the academic position "Associate Professor" in the scientific field and professional direction of the competition. In particular, the applicant meets the minimum national requirements in the professional field and no plagiarism was found in the scientific works submitted at the competition.

I give a **positive assessment** of the application of **Chief Assistant Professor PhD Alexander Petkov** for the academic position of "Associate Professor" in the professional field 4.5. Mathematics (Geometry) in the competition announced for the needs of Sofia University "St. Kliment Ohridski ", Faculty of Mathematics and Informatics.

## II. GENERAL CONCLUSION

Based on the above, **I recommend** the scientific jury to propose to the body of Faculty of Mathematics and Informatics at Sofia University "St. Kliment Ohridski", competent on the election on this procedure, **to elect Chief Assistant Professor PhD Alexander Vladimirov Petkov to occupy the academic post "Associate Professor"** in the professional field 4.5 Mathematics (Geometry).

07.09.2020                                        Prepared by:

Assoc. Prof. Yulian Tsankov