MUNI

PUBLIC LECTURE EVALUATION

Masaryk University

Faculty	Faculty of Science
Procedure field	Mathematics – Mathematical Analysis
Applicant	doc. RNDr. Michal Veselý, Ph.D.
Lecture date	16. 10. 2024
Lecture topic	Non-almost periodic and non-asymptotically almost periodic solutions of difference and differential equations
Persons present (number)	40 (= 36 on-site + 4 online)
Designated evaluators (board members)	Prof. RNDr. dr hab Jan Andres, DSc. (on-site)
	Prof. Gennaro Infante, Ph.D. (online)
	Prof. RNDr. Michal Fečkan, DrSc. (online)
	Prof. Mgr. Pavel Řehák, Ph.D. (on-site)
	Prof. RNDr. Roman Šimon Hilscher, DSc. (on-site)

The committee selected the above title of the public lecture

"Non-almost periodic and non-asymptotically almost periodic solutions of difference and differential equations"

from the provided list of topics. The committee approved its three members (prof. Andres, prof. Řehák, and prof. Šimon Hilscher) to evaluate the public lecture of the applicant. The remaining two members of the committee (prof. Fečkan and prof. Infante) were present at the public lecture online. All members of the committee expressed their opinion on the public lecture of the applicant during the meeting of the committee (in hybrid form via Zoom), which followed immediately after the public lecture. Based on the discussion, the committee presents the following evaluation.

The applicant gave a lecture on almost periodic differential and difference equations and systems and their solutions. The applicant introduced various notions, which generalize the periodicity of a sequence or a function – limit periodicity, almost periodicity, and asymptotic almost periodicity. The lecture was then divided into three main parts. The first part was devoted to linear difference systems with limit periodic and almost periodic coefficients, with the emphasis on the coefficients from a given (weakly) transformable group (particular examples were presented) or from a general commutative group. The second part was devoted to linear differential systems with almost periodic coefficients. In each of these two parts the applicant presented his results in the context of the related literature. He paid

special attention to the question of the existence of non-almost periodic solutions. In this regard he presented a solution to a problem (presented in the monograph of A. M. Fink, Springer-Verlag, Berlin, 1974) pertaining the existence of non-almost periodic solutions of skew-symmetric almost periodic systems. The presented results also demonstrated the work of the applicant with his doctoral student. The third part of the lecture was devoted to the used methods and special constructions developed by the applicant. The talk was concluded by an overview of research directions for further investigations, academic metrics of the applicant (with citation analysis), and service to the mathematical community (including extensive reviewing of the applicant).

The discussion at the end of the lecture included questions posed from the on-site and online audience. The questions – posed by prof. Paseka, prof. Andres, prof. Fečkan, prof. Čermák, and prof. Řehák – were related to the scientific work of the applicant:

1. What is the example of an infinite field, in which the unit ball is not compact?

2. Is it possible to extend the results to nonhomogeneous systems, employing the known Fredholm alternative?

3. Make more precise the relationship between the discrete and continuous concepts of quasi-periodicity and limit periodicity.

4. Is it possible to omit the uniform continuity condition in the assumption in order the notions can be understood at least in the sense of Stepanov?

5. Is it possible to extend the results to nonlinear systems?

6. Is it possible to characterize the limit periodicity property in a similar way, as it is known for periodic sequences (the Calvarho method)?

7. Describe the main differences in the methodology between the dicrete and continuous linear systems.

The applicant demonstrated in his talk as well as in the discussion that he is an expert in the field of mathematical analysis. The talk was carefully prepared, the presentation and explanation of research were adapted to sufficient extent to non-specialists in the field, keeping in mind a proper level of precision. The questions were answered satisfactorily.

Conclusion

The lecture delivered by Michal Veselý, entitled "Non-almost periodic and non-asymptotically almost periodic solutions of difference and differential equations" and delivered as part of the professor appointment procedure, **demonstrated** sufficient scholarly qualifications and pedagogical capabilities expected of applicants participating in a professor appointment procedure in the field of Mathematics – Mathematical Analysis.

The lecture took place in a hybrid form at the Department of Mathematics and Statistics, Faculty of Science, Masaryk University, Kotlářská 2, Brno, on October 16, 2024, at 16:00. The above-mentioned members of the board attended the lecture and provided its evaluation. All designated evaluators are familiar with the text of the evaluation and agree with it.

Date: 16.10.2024

Jan Andres

Pavel Řehák

Roman Šimon Hilscher