MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION
OF THE REPUBLIC OF UZBEKISTAN

NATIONAL UNIVERSITY OF UZBEKISTAN NAMED AFTER MIRZO ULUGBEK

UNIVERSITI TEKNOLOGI MARA (UiTM), MALAYSIA

V.I.ROMANOVSKY INSTITUTE OF MATHEMATICS ACADEMY OF SCIENCE

REPUBLIC OF UZBEKISTAN

KAZAKH NATIONAL PEDAGOGICAL UNIVERSITY NAMED AFTER ABAY, KAZAKHSTAN

UNIVERSITI MALAYSIA TERENGGANU (UMT), MALAYSIA

# ABSTRACTS

of the Uzbekistan-Malaysia international conference

## COMPUTATIONAL MODELS AND TECHNOLOGIES

September 16-17th, 2022

TASHKENT

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**COMPUTATIONAL MODELS AND TECHNOLOGIES**

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**Computational models and technologies**: Abstracts of the Uzbekistan-Malaysia international conference, Editor-in-chief: Aloev R.D., editors: Hayotov A.R. and Khudoyberganov M.U., September 16-17, 2022, Tashkent, Uzbekistan

This conference is held by National University of Uzbekistan (NUUz) under the research Grant "Analysis of Lie symmetry, analysis and modelling of the stability of hyperbolic systems on Lyapunov" project code is UZB-Ind-2021-87.

National University of Uzbekistan with partners cordially invites prospective authors to submit original and unpublished papers for publication and to participate with a speech in the International Conference on ”Computational Models and Technologies”, which will be held on September 16-17, 2022.

The conference is aimed at providing a platform for researchers to share their research findings from various disciplines and create a space for intellectual discussions.

The conference topics are:

1. Computational mathematics. Computing technology;
2. Applied Mathematics. Applied statistics. Engineering Mathematics and Technologies. Fuzzy analysis;
3. Mathematical modelling. Hydrodynamics;
4. Theory of function. Computational Algebra.

# Table of Contents

WELCOME ADDRESS

**Dear colleagues and conference participants!**

The development and well-being of our country are closely related to the discovery of innovations in science and their implementation. Based on this goal, the National University of Uzbekistan named after Mirzo Ulugbek jointly with international partners has been organizing an international conference in the field of computational models and technologies. This is a continuation of the traditions started by our mentors, Professors G. N. Salikhov, M.I. Israilov and H. A. Muzafarov. The first international conference on computational models and technologies was held in 2020. Since then a lot of progresses have been made in the field of computational modeling and technologies.

The coronavirus pandemic and the economic crisis forced to look at applications of science in various areas of the human life. The role of mathematics in this process is extremely important. The researchers from the National University Uzbekistan also made great contribution here. That was judged by the "Quacquarelli Symonds"international rating agency ranking the National University of Uzbekistan among the top 500 universities in the "Subject Rankings".

In conjunction with the situation caused international cooperation between educational institutions is of great interest. Therefore, to improve cooperation in the field of science and research between institutes of Uzbekistan, Malaysia, the Republic of Kazakhstan and other leading higher educational institutions lectures by leading scientists, conferences and scientific seminars were organized.

The theoretical and practical solution to the problems set up by experts gives an opportunity for further development. This in its turn renews the content of the education and improves its essence.

Thus, I invite scientific organizations, higher educational institutions, public organizations, manufacturing enterprises, and all our well-intentioned friends to cooperate in the education of a free and free-thinking young generation that has modern knowledge, combines universal and national values, and feels responsible for the happiness of our countries.

In addition, I would like to take this opportunity on behalf of the organizing committee to express my sincere gratitude to the Ministry of Higher and Secondary Special Education and the Ministry of Innovative Development of the Republic of Uzbekistan.

I am confident that the international conference being held in cooperation today will raise the international scientific-research relations to a higher level between the nations, as well as between the educational institutions of Uzbekistan, Malaysia and Kazakhstan.

Let us enjoy the achievements in the field of science, discuss and debate the results obtained. The achievements are not the merit of one or another country, they belong to the humanity.

I wish the success in the work of the conference.

Welcome to the second Uzbekistan-Malaysia International Conference on Computational Models and Technologies (CMT 2022)!

**Khudoyberganov M.U.**
**Chairman of the Organizing Committee of**
**the International Confrence**

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## ON THE APPROXIMATION OF THE FUNCTION ON THE UNITE SPHERE BY THE SPHERICAL HARMONICS

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In this paper we discuss convergence and summability of the series of smooth functions in eigenfunction expansions associated with the Laplace operator on the unite sphere. We consider different topologies for the approximations such expansions. In particular we discuss approximation with respect mixed norms in the Lebesques spaces.

## Quasi-symmetric conjugation of critical circle homeomorphisms with infinite number of break points

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The one-dimensional dynamical system is one of the intensively investigated branches of the theory of dynamical systems. In the theory of one-dimensional dynamical system, the investigations of invariant measure, conjugacy, renormalization, and rigidity are always interesting for researchers due to their wide applications. This work is devoted to the investigation of the conjugacy between linear rotation and circle homeomorphisms with singularities. It is known that [1] the conjugacy between linear rotation and a circle homeomorphism $f$ with a critical point, that is, $f'$ vanishes at one point, is a singular function. The analogical results were proven by [2] and [3] for circle diffeomorphism with several break points, that is, $f'$ has jumps at these points. In this work, we prove that the conjugacy between linear rotation and circle homeomorphisms with break and critical types of singularities preserves the "low"smoothness property although it is a singular function. More precisely, consider circle homeomorphisms $f$ satisfying the following conditions:

- $f$ has a critical point of order $t > 1$ , that is, there exists $\alpha(x) \in C^3$ diffeomorphism with $\alpha(x_{cr}) = 0$;such that $f(x) = \alpha(x)|\alpha(x)|^{t-1} + f(x_{cr})$ in the some $\delta$-neighbourhood of $x_{cr}$.
- $f$ has infinitely many break points $x_i^b$, $i = 1, 2, 3...$, that is, there exist one sided positive derivatives $f'(x_i^b) \pm 0)$ and $\frac{f'(x_i^b - 0)}{f'(x_i^b + 0)} \neq 1$.
- $f$ has no periodic orbits and satisfies Denjoy's type of smoothness except at break points.

We prove that the conjugacy between linear rotation and circle homeomorphisms satisfying above conditions is a quasi-symmetric map if and only if its rotation number is of bounded type. Note that this result extends the main result of the work [4].

### References

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