

**Jednota slovenských matematikov a fyzikov**  
Pobočka Košice

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**Strojnícka fakulta TUKE**  
Katedra aplikovanej matematiky a informatiky

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# **24. Konferencia košických matematikov**

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**Herľany**  
**16. – 18. apríla 2026**



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VEDECKOTECHNICKÝCH  
SPOLOČNOSTÍ



**Pobočka Košice**



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## Predhovor

Vážení účastníci Konferencie košických matematikov a ostatní čitatelia!

Otvárate Zborník abstraktov príspevkov z Konferencie košických matematikov, ktorá sa v roku 2026 koná v dňoch 16. – 18. apríla.

Tohtoročná 24. Konferencia košických matematikov prichádza v období typicky premenlivého jarného počasia. Apríl vie byť nevyspytateľný – chvíľu slnečný, chvíľu upršaný, ba i mrazivý, a istú mieru nevyspytateľnosti so sebou prináša aj samotný život. Pri zrode myšlienky tejto konferencie stál aj prof. RNDr. Stanislav Jendroľ, DrSc., ktorý ju dlhé roky pomáhal formovať ako jeden z jej hlavných organizátorov, až kým v nedávnej minulosti nepodal pomyselné žezlo svojim nasledovníkom. Do Herľan sa však vždy rád vracal a s potešením sledoval, ako sa jeho „konferenčnému dieťaťu“ darí rásť a rozvíjať sa.

O to bolestnejšie sme prijali správu, že profesor Jendroľ, ktorý mal byť jedným z pozvaných prednášajúcich tohto ročníka, nás 17. novembra 2025 náhle opustil. Aj preto má tohtoročná konferencia osobitný rozmer – jej súčasťou je i memoriál venovaný jeho pamiatke. S úctou si pripomíname nielen jeho vedecký prínos, ale aj jeho ľudský rozmer a stopu, ktorú zanechal v našej komunite.

Konferencia si dlhodobo zachováva svoju príjemnú, takmer rodinnú atmosféru, ktorú, ako veríme, oceníte aj vy. Práve táto atmosféra umožňuje otvorené diskusie, výmenu skúseností a vytváranie nových odborných i priateľských väzieb.

Tradične zostávame verní trojdňovému formátu podujatia, ktorý okrem odborného programu ponúka aj priestor na neformálne stretnutia a v neposlednom rade aj možnosť zažiť erupciu unikátneho studenododného gejzíru v Herľanoch.

Odborný obsah konferencie je zabezpečený sériou pozvaných prednášok i prihlásených referátov účastníkov. Pozvanie prednášať na konferencii prijali:

- Mgr. Dušana Babicová, PhD.,
- RNDr. Mária Dományová,
- doc. RNDr. Jozef Hanč, PhD.,
- doc. RNDr. Jana Kopfová, Ph.D.,
- doc. PaedDr. Janka Medová, PhD.,
- Mgr. Marek Sýs, PhD.

Veríme, že ich vystúpenia oslovia široké publikum. Ich abstrakty, ako aj abstrakty ostatných príspevkov, vrátane príspevkov prezentovaných v rámci štvrtkového memoriálu, spolu s programom podujatia a kontaktmi na účastníkov nájdete v tejto publikácii. Súčasťou programu je opäť aj piatkový didaktický blok prednášok, ktorý si nachádza čoraz väčšiu odozvu najmä medzi pedagógmi.

Konferencia sa koná pod záštitou Jednoty slovenských matematikov a fyzikov pri SAV – pobočka Košice, v spolupráci s Ústavom riadenia a informatizácie výrobných procesov FBERG TUKE, Katedrou aplikovanej matematiky a informatiky Sjf TUKE, Ústavom matematických vied Prírodovedeckej fakulty UPJŠ a pobočkou Slovenskej spoločnosti aplikovanej kybernetiky a informatiky pri ÚRIVP FBERG TUKE – členom Zväzu slovenských vedeckotechnických spoločností.

V mene organizátorov veríme, že si z konferencie odnesiete nielen nové odborné poznatky, ale aj príjemné zážitky zo stretnutí s kolegami a priateľmi.

Editori: Ján Buša  
Erika Fecková Škrabuláková  
Andrea Feňovčíková

## Editorial

Dear participants of the Conference of Košice Mathematicians and other readers!

You are opening the Book of Abstracts of contributions from the 24th Conference of Košice Mathematicians, which in 2026 takes place on April 16 – 18.

This year’s Conference of Košice Mathematicians comes at a time of typically changeable spring weather. April can be unpredictable – sometimes sunny, sometimes rainy, even frosty, and a certain degree of unpredictability is also inherent in life itself. At the origin of the idea of this conference stood also Professor Stanislav Jendrol, who helped shape it as one of its main organizers for many years, until in the recent past he passed the symbolic baton to his successors. However, he always gladly returned to Herľany and with pleasure observed how his “conference child” continued to grow and develop.

All the more painfully, we received the news that Professor Jendrol, who was to be one of the invited speakers of this year’s conference, suddenly passed away on November 17, 2025. For this reason, this year’s conference carries a special dimension – as a part of the program a memorial dedicated to his memory is included. With respect, we remember not only his scientific contribution but also his human qualities and the mark he left on our community.

The conference has long maintained its pleasant, almost family-like atmosphere, which we believe you will appreciate as well. It is precisely this atmosphere that enables open discussions, the exchange of experience, and the creation of new professional as well as personal connections.

Traditionally, we remain faithful to the three-day format of the event, which, in addition to the professional program, also offers space for informal meetings and, last but not least, the opportunity to experience an eruption of the unique cold-water geyser in Herľany.

The academic content of the conference is ensured by a series of invited lectures as well as contributed talks by participants. The invitation to give a lecture at the conference was accepted by:

- Mgr. Dušana Babicová, PhD.,
- RNDr. Mária Dományová,
- doc. RNDr. Jozef Hanč, PhD.,

- doc. RNDr. Jana Kopfová, Ph.D.,
- doc. PaedDr. Janka Medová, PhD.,
- Mgr. Marek Sýs, PhD.

We believe that their presentations will appeal to a wide audience. Their abstracts, as well as the abstracts of other contributions, including those presented within the Thursday memorial, together with the program of the event and contact information for participants, can be found in this publication. The program once again includes a Friday didactic block of lectures, which has been receiving increasing attention, especially among educators.

The 24th Conference of Košice Mathematicians is held under the auspices of the Union of Slovak Mathematicians and Physicists by Slovak Academy of Science – Košice Branch, in cooperation with the Department of Control and Informatization of Production Processes of FBERG TUKE, the Department of Applied Mathematics and Informatics at the Faculty of Engineering of TUKE, the Institute of Mathematical Sciences at the Faculty of Science of UPJŠ, and the branch of the Slovak Society for Applied Cybernetics and Informatics at URIVP FBERG TUKE – a member of the Association of Slovak Scientific and Technological Societies.

On behalf of the organizers, we believe that you will take away not only new professional knowledge from the conference, but also pleasant experiences from meeting colleagues and friends.

Editors: Ján Buša  
Erika Fecková Škrabuláková  
Andrea Feňovčíková

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**Memorial**  
**dedicated to Professor Jendrol'**

# A path, a trail, or a walk: The journey of a graph theorist

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This contribution offers a reflection on the life of a graph theorist, portrayed as a journey through an ever-unfolding structure. It begins in a small village Duplín in the Stropkov district, where the first vertex is placed, modest yet full of latent connections. From there, the path gradually extends, shaped by decisions, encounters, and moments that resemble branching edges and unexpected turns.

Along the way, various nodes and intersections emerge – milestones marking personal growth, changing environments, and new directions. Some paths are straightforward, others require revisiting earlier points, forming cycles of experience and reflection. Each stage of this life corresponds to vertices connected by edges of collaboration, curiosity, and persistence, creating a coherent yet dynamic whole.

His legacy may be seen as an open walk – one that does not terminate, but continues through those who follow. This abstract invites the reader to view a mathematical life not merely as a sequence of accomplishments, but as a meaningful journey through a rich and evolving graph.

## For community

Štefan Tkačik

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This contribution highlights the role of Professor Stanislav Jendroľ in building and sustaining the mathematical community, particularly in the field of graph theory. His efforts extended far beyond individual research, significantly shaping platforms for collaboration, discussion, and the exchange of ideas [1].

He was one of the key figures behind the establishment and development of the Cycles and Colorings conference series, which has become a well-recognized meeting point for researchers in graph theory. In addition, he contributed to the tradition of the Conference of Košice Mathematicians and actively participated in the organization of several Czech-Slovak Conferences GRAPHS (ČSGT), strengthening cooperation within the regional mathematical community [2].

At the local level, he was closely connected with the seminar KOKOS, fostering regular academic exchange and supporting younger researchers. Through his long-term involvement in the Union of Slovak Mathematicians and Physicists at the Slovak Academy of Sciences – Košice Branch, as well as his teaching at the Pavol Jozef Šafárik University, he also played an important role in promoting mathematical activities and education.

Through these initiatives, he helped create a vibrant and enduring network of collaboration, leaving a legacy not only in research, but in the community itself.

**Acknowledgement.** This work was supported by the Cultural and Educational Grant Agency under grant KEGA 004KU-4/2025 Osobnosti slovenskej matematiky III – životné vzory pre budúce generácie<sup>1</sup>.

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<sup>1</sup>Personalities of Slovak Mathematics III – Life Role Models for Future Generations

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## “Tento” graphs

Erika Fecková Škrabuľáková, Zuzana Šárošiová

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This contribution is devoted to the scientific work of Professor Stanislav Jendroľ, focusing on his lasting impact on the development of graph theory. His research is characterized by a deep interest in structural properties of graphs, particularly in the interplay between local configurations and global behavior. Over the course of his career, he contributed to a variety of topics, including planar graphs, graph colorings, and the study of cycles and connectivity.

A distinctive feature of his work lies in the careful analysis of local structures and their influence on broader graph properties, often leading to elegant and nontrivial results. His approach combined technical precision with a strong intuitive understanding of graph behavior, allowing him to address challenging problems and inspire further research in the field.

Beyond individual results, his body of work forms a coherent and influential line of inquiry that continues to motivate ongoing investigations.

**Acknowledgement.** This work was supported by the Slovak Grant Agency for Science under grant no. VEGA 1/0674/23, and the Cultural and Educational Grant Agency of the Ministry of Education, Research, Development and Youth of the Slovak Republic under grant no. KEGA 006TUKE-4/2024.

# Memories of Mirko Horňák and Tomáš Madaras on Stano Jendroľ

**Mirko Horňák, Tomáš Madaras**

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This contribution is a collection of personal and informal memories of Stano Jendroľ, written from the perspective of colleagues and friends who had the privilege to know him well. We recall shared journeys to conferences, social gatherings, and moments of leisure, all of which reflected his warmth, humour, and remarkable ability to bring people together. Through these stories, we try to evoke not only his presence within the mathematical community, but also the atmosphere he created around him – open, friendly, and full of life. These recollections are offered as a tribute in his memory, to a respected colleague and a dear friend whose personality left a lasting imprint on all of us who had the good fortune to spend time with him.

## Stano Jendroľ – as I knew him

**Igor Fabrici**

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I would like to share my memories of Stano, of our first meeting, of him as my teacher and thesis advisor, and finally as my colleague and co-author of numerous scientific results. I would like to recall our conversations about workplace, conferences, and the mathematical community, and to share some of his views. I would like to see him again. . .

## Letterarium

Martin Bača<sup>1</sup>, Erika Fecková Škrabuľáková<sup>2</sup>

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This contribution, entitled Letterarium, presents a collection of personal messages, reflections, and memories from colleagues and friends of Professor Stanislav Jendroľ, both from Slovakia and abroad. In preparation for the memorial event at the Conference of Košice Mathematicians, international and local contributors were invited to share brief notes about their personal experiences with Professor Jendroľ – highlighting who he was to them, the ways he inspired, mentored, or supported them, and the relationships they cherished.

The collected messages provide a unique insight into the human side of a mathematician whose professional accomplishments were accompanied by warmth, generosity, and dedication to the community. Read aloud during the memorial session, these reflections create a vivid tapestry of appreciation, remembrance, and gratitude, capturing not only his professional influence but also the personal connections and lasting impressions he left on those around him. In this way, the Letterarium becomes a heartfelt tribute, celebrating the enduring impact of a remarkable life in mathematics and friendship.

## Invited lectures

# AI assistants in mathematics education: Principles of didactic design and empirical findings

Dušana Babicová

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The aim of this contribution is to present an original, didactically grounded approach to the use of AI tools in mathematics education, focused on supporting both conceptual understanding and students' attitudes toward mathematics, and to examine its impact on the learning process. The study builds on practical experience and research conducted in the mathematical preparation of future primary school teachers, who often enter their studies with high levels of mathematics anxiety and low self-confidence, which may subsequently influence their future teaching practice.

The approach is based on the development and implementation of a specialized, author-designed AI assistant, called the Didactic-Arithmetic Coach (DAK), conceived as a tool for supporting students' self-study. Instead of providing ready-made solutions, the assistant guides students through step-by-step hints and targeted questions, leading them toward their own solutions while maintaining active cognitive engagement and gradually reducing the level of support as competence increases. This design emphasizes the importance of structured guidance and mastery experience in learning mathematics. In addition to the AI assistant, AI-generated thematic podcasts were used as a supplementary form of support. The concept of an AI assistant based on step-by-step guidance has subsequently been extended to other domains, such as mathematics education in management study program, where it has been adapted to domain-specific needs, demonstrating its transferability across disciplines.

The empirical part of the study is based on data collected from students of primary teacher education within a university course focused on the didactics of arithmetic (pre-tests and post-tests) and builds on a series of empirical studies conducted by the author and her research team [1, 2, 3, 4]. The research employs questionnaire-based data collection and

statistical analyses, including factor analysis, correlation analysis, regression models, and mediation analysis.

The pre-test results identified significant predictors of AI use and provided implications for the design and implementation of AI tools in education. The post-test results indicate that the reduction of mathematics anxiety is strongly associated with the perceived academic support provided by the AI assistant. This effect is not direct but operates through a mediating mechanism—the reduction of situational stress during problem solving, which reflects an increased sense of control and mastery, strengthens self-confidence, and leads to a reduction in global mathematics anxiety. Concurrently, the findings show that the most commonly reported barriers to AI use, such as perceived inaccuracy or complexity, do not significantly reduce the effectiveness of the intervention, while epistemic trust plays a key role in long-term acceptance.

The results suggest that the effectiveness of AI in mathematics education depends primarily on its didactic design rather than on technological features alone. At the same time, the transferability of the proposed approach indicates its potential for broader application across different levels and forms of mathematics education. The study contributes to a deeper understanding of how AI can support both cognitive and affective aspects of learning and offers implications for the preparation of future teachers.

**Keywords.** Artificial intelligence in education, mathematics education, mathematics didactics, mathematics anxiety, AI assistant, podcasts, teacher education, statistical analysis.

**Acknowledgement.** This work was supported by the Cultural and Educational Grant Agency under grant KEGA 004KU-4/2025.

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## One problem – multiple paths: On motivation in mathematics

Mária Dományová

Formerly at Secondary Grammar School of Pavol Horov in Michalovce,  
Slovakia

Some mathematical problems have an interesting property: they allow for several natural solutions and simultaneously appeal to different ways of thinking. The lecture addresses the issue of motivation when working with mathematical problems, particularly in connection with their selection and the way work is organized during a lesson.

Using two geometric problems from elementary mathematics, it will be demonstrated how a well-chosen problem can encourage different approaches to solving it. The first problem allows for multiple solutions (e.g., using the Pythagorean theorem, triangle similarity, or Euclid's theorems). In terms of work organization, group work is preferred, supplemented by a playful element of randomly assigned hints, which can boost the solvers' activity and their willingness to experiment with different approaches. The second problem leads to the use of trigonometric relations and allows for comparison of different solution methods.

When interpreting the experiences, a simple typology of motivational preferences, inspired by management literature, will also be applied.

**Keywords.** Motivation in mathematics, motivation through problems, approaches to problem-solving.

# Artificial intelligence and data science as powerful tools for mathematics and mathematics education

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Generative artificial intelligence (AI) is currently transforming research, education, and professional practice at an unprecedented pace. Neither mathematics nor mathematics and science education is an exception.

In the first part of the lecture, we briefly review the recent development of generative AI based on large language models and highlight selected capabilities that are already influencing mathematical work, mathematical research, and a broad spectrum of applications closely connected with data science.

In the second part, we turn to the educational dimension of this development. We discuss how generative AI is beginning to reshape the teaching and learning of mathematics and science, with particular attention to its potential added value for both teachers and students. At the same time, we address several serious challenges associated with its use, especially those concerning assessment, academic integrity, critical evaluation of AI-generated outputs, and the responsible integration of AI into educational practice.

The lecture is grounded in our direct experience with the use of AI over the past three years in mathematical research carried out within APVV projects in mathematics and data science, as well as in university teaching in several mathematics-based courses at P. J. Šafárik University in Košice.

Finally, we reflect on the broader question of how AI may influence the future character of mathematical work and contribute to the ongoing transformation of mathematics education, and of education more generally.

**Keywords.** Generative artificial intelligence, large language models, data science, mathematical research, mathematics education, open data science tools.

**Acknowledgement.** This work was supported by the Slovak Research and Development Agency under the contract No. APVV-21-0216, APVV-21-0369, and by the Slovak Scientific Grant Agency VEGA under grant VEGA 1/0585/24.

## Simple equations, complex dynamics

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How can simple mathematical rules produce extraordinarily rich and possibly unpredictable behavior? This presentation will explore this question through several key ideas from modern dynamical systems and chaos theory. The first part will introduce classical results on the dynamics of continuous maps on intervals. In particular, Sharkovskii theorem reveals a remarkable ordering of natural numbers that determines how periodic orbits must appear in such systems. A striking consequence is the famous Li–Yorke result stating that the existence of a periodic orbit of period three forces chaotic dynamics. This result illustrates how a seemingly simple system can suddenly exhibit extremely complex long-term behavior.

To demonstrate these ideas specifically, the logistic map will be presented as a classical model of population growth. Although defined by a simple nonlinear recurrence relation, the logistic map displays a surprising variety of dynamical regimes depending on the parameter value. The analysis shows the transition from stable equilibria to oscillations and eventually to deterministic chaos through the well-known period-doubling cascade. The bifurcation diagram and the universal Feigenbaum constant highlight the deep mathematical structure underlying this transition.

The second part of the talk will show recent results of the author related to more complicated equations connected with the logistic map, in particular the results for a Volterra equation with negative feedback and the Belousov–Zhabotinski reaction system. These reaction-diffusion equations describe the interaction of chemical species and lead to traveling wave solutions connecting different equilibria.

The presentation will conclude with examples of fractals such as the Sierpinski triangle and related patterns arising from simple iterative processes, presented on authors own mathematical art. These images illustrate how symmetry, iteration, and chaos can combine to produce intricate geometric structures. Together, these examples demonstrate a central theme

of modern mathematics: complex and often beautiful patterns can emerge from surprisingly simple deterministic rules.

**Keywords.** Dynamics, periodic solutions, chaos.

## Catalan numbers as a context for connecting combinatorial and computational thinking

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Catalan numbers are a standard topic in undergraduate combinatorics courses and provide a particularly productive context for connecting combinatorial and computational thinking. Within a long-term collaboration based on co-design and lesson study, we designed and implemented a three-lesson sequence centered on abstraction, searching for bijections, programming, and proof through guided discovery. Particular attention is paid to the role programming can play in solving combinatorial problems and to the kinds of mathematical understanding it may support.

Based on the analysis of two students' approaches, we show that programming may serve at least two distinct epistemic functions in mathematics. In the first case, it acts as a model of the structure of the problem: the student generates Dyck words from their recursive decomposition, which makes the set of outcomes visible, reveals its partition into classes, and leads to a recursive justification of the result. In the second case, programming acts as an experimental environment: the student generates a superset of candidate strings, tests their validity, and arrives at the correct formula through counting and correcting for overcounting, but without an explicit explanation of its structural basis.

Both strategies represent legitimate forms of computational thinking, yet they lead to different kinds of mathematical work. While the first makes the generative structure of the problem visible and naturally opens a path toward proof, the second supports the formulation and testing of hypotheses. Finally, the implications of this distinction for the co-design of tasks intended to connect combinatorial and computational thinking in undergraduate mathematics education are discussed.

**Keywords.** Combinatorial thinking, computational thinking, mathematics education.

**Acknowledgement.** This work was supported by the EU Erasmus+ project 2025-1-SK01-KA220-HED-000362022 STEaiM CT Empowering Pre-Service STEM Teachers with AI for Computational Thinking.

## LLL: A tool for hard problems

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The LLL algorithm (Lenstra–Lenstra–Lovász) is a fundamental tool in computational number theory and the geometry of numbers. It provides a polynomial-time method for lattice basis reduction, enabling efficient approximation of short vectors and offering a practical approach to a range of problems that are otherwise computationally intractable. Despite its long-standing presence, its versatility across different areas of mathematics continues to be revealed through new applications.

The talk will show how certain hard problems, such as finding small roots of modular equations or factorization with partially known information, can be reformulated in a way that makes them amenable to lattice reduction. It will emphasize how algebraic structure can be encoded so that LLL recovers the desired solutions via short vectors.

The strength of these techniques will be further demonstrated in cryptographic contexts. In particular, the ROCA attack will be revisited, where additional structure in RSA moduli enables the factorization of large composite integers, and the Minerva attack will be discussed, where partial information suffices to recover hidden parameters and produce valid signatures. These examples show how lattice methods translate theoretical insights into effective real-world attacks.

The aim of the talk is to highlight LLL as a versatile and accessible tool that can be fruitfully applied across a wide range of mathematical problems, and to encourage its broader adoption within the mathematical community.

**Keywords.** LLL algorithm, lattice reduction, computational number theory, cryptanalysis.

## Conference contributions

# Multimodal generative AI in education: Designing AI assistants and creating learning content

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The integration of artificial intelligence into education presents both opportunities and challenges for teachers across educational levels. Although AI tools are widely available, many educators still lack concrete examples of their didactically meaningful use, particularly in supporting active student learning. The aim of this workshop is to present practical ways of using multimodal generative AI tools in education, drawing on experience from courses in mathematics didactics, and to offer concrete approaches and inspiration that participants can directly try out and adapt to their own subjects and teaching contexts.

The workshop builds on the author's teaching experience and research in teacher education, focusing on the integration of multimodal generative AI tools into mathematics-related courses for pre-service teachers. It presents concrete approaches to using tools such as ChatGPT, NotebookLM, Gamma, and others in lesson preparation, classroom interaction, and the creation of learning materials.

In the practical part, participants will design and create their own teaching materials using these AI tools, with a focus on direct applicability in their own subjects and teaching practice. The workshop also includes reflection on the possibilities and limitations of AI use in education.

**Keywords.** Artificial intelligence in education, generative AI, multimodal AI, AI assistants, podcasts, content creation, active learning.

**Acknowledgement.** This work was supported by the Cultural and Educational Grant Agency under grant KEGA 004KU-4/2025.

# A generalized OWA operator and its application in image denoising

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Ordered weighted averaging (OWA) operators are aggregation functions introduced by Yager in 1988 [4]. They are widely used in decision making, fuzzy systems, and information processing, where they have often achieved better results than standard methods. In this talk, based on [1], we introduce a novel generalization of the OWA operator using conditional aggregation operators and show how this approach can improve image denoising.

Our proposed approach keeps the main idea of the OWA operator, which is reordering the input vector depending on the situation. Unlike the standard OWA operator, our framework also enables modeling set-dependent aggregation processes by incorporating selected subsets. This provides a principled mechanism for choosing which inputs are aggregated [2]. For example, in image processing, diagonal pixels could form one subset while neighboring pixels in rows and columns form another, contributing differently to the central pixel.

We investigate the main structural properties of the proposed operator and formulate conditions under which these properties are met. Furthermore, we show that the introduced framework includes several known aggregation models and existing generalizations of the OWA operator, such as the TOWA [5], HWA [3], and IOWA [6] operators, as particular cases, highlighting its unifying character. Finally, the proposed operator is applied to image denoising. Experimental results indicate that the proposed approach yields better denoising results than the standard median filter.

**Acknowledgement.** The work was supported by the Slovak Research and Development Agency under the contract No. APVV-21-0468 and by the grant scheme VVGS-PF-2026-3897.

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## **Mattecoach: Connecting support for pupils with the preparation of future mathematics teachers**

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The presentation introduces the Mattecoach project, an international initiative originally developed in Sweden, where it has been operating since 2009. The project is currently also implemented in Scotland and, since 2024, in the Czech Republic. In the Czech Republic, Mattecoach is implemented under the auspices of the Palacký University Olomouc. The project is based on an online application designed to support mathematics learning for primary and secondary school pupils through text-based chat and a shared whiteboard. The coaches involved in the Czech version are pre-service mathematics teachers from the Faculty of Science and the Faculty of Education.

The aim of the presentation is to show how Mattecoach connects support for pupils with the professional development of pre-service mathematics teachers. The contribution is based on the analysis of the first year of the

Czech version of the project, including data on the number of conversations, the most common mathematical topics addressed by pupils, and reflections on real online interactions between pupils and coaches.

The presentation will focus on the principles of the application, the peer-to-peer approach used in communication with pupils, and the benefits of the project for future mathematics teachers. Results from the first year of operation suggest that Mattecoach is used most frequently by lower secondary pupils and first-year secondary school students, especially in periods before entrance examinations and final exams. The presentation will also include reflections of pre-service teachers on their participation in the project and on the ways in which the experience influenced their communication skills, confidence, and approach to teaching mathematics.

In addition, the presentation will introduce current activities related to the project, such as the development of teaching materials for pre-service teachers, international research collaboration, and support for mathematically gifted pupils. The contribution also discusses possible opportunities for further development and future plans of the project.

**Keywords.** Mattecoach, mathematics education, online mathematics support, pre-service mathematics teachers, peer-to-peer learning, mathematics didactics, gifted pupils, international collaboration.

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## Generalising a Łukasiewicz-based representation of the discrete Choquet integral

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Several generalisations of the Choquet integral have recently appeared in the literature, mainly due to their applicability in various fields (see, e.g., [3]). Many of these approaches start from a classical expression of the Choquet integral

$$\mathbf{Ch}(\mathbf{x}, \mu) = \sum_{i=1}^n x_{(i)} \cdot (\mu(E_{(i)}) - \mu(E_{(i+1)})),$$

where  $(\cdot)$  denotes a permutation such that  $x_{(1)} \leq x_{(2)} \leq \dots \leq x_{(n)}$ ,  $E_{(i)} = \{(i), (i+1), \dots, (n)\}$  and  $E_{(n+1)} = \emptyset$ . In many generalisations, the product operation in this expression is replaced by a more general binary operation. Although the resulting operators may differ from the classical Choquet integral and may no longer satisfy all properties of aggregation functions, they have shown promising results in applications.

This motivates us to study alternative forms of the Choquet integral. In this contribution, we focus on a less commonly used representation of the discrete Choquet integral based on the Łukasiewicz semicopula. This representation was first introduced in [1], Formula (4.5), and later proved in [4] using Schmeidler's characterisation of the Choquet integral. While this representation is based on the Łukasiewicz semicopula, it involves the minimum operator in its arguments. We generalise this construction by replacing the minimum with conditional aggregation operators [2], which leads to a new class of aggregation operators extending the classical Choquet integral.

Within this framework, we investigate several properties of the proposed integral. In particular, we derive conditions under which it preserves important characteristics of the classical Choquet integral, such as monotonicity and comonotone additivity.

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## Analyzing an exponential function task

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When working with and connecting different function representations, it is important to consider all the invariant properties of functions. As [1] claimed, a lot of students tend to interpret graphs as pictures, where they fail to note differences in scale and expect scales to start at zero, and they connect dots rather than fit curves to noisy data. Also, as [2] stated, “a complete understanding of graphical representations means realizing what visual features of the graph will not change under the change of scales” (p. 19). This is closely related to the increasing use of digital technology in mathematics. To understand how students work with function equations and their graphs, we have selected a task through which we aimed to examine whether students would be misled by a software-generated graph, or whether they would use their knowledge of the topic to solve the task. The students were given the function equation  $f : y = 10^x$ , as well as a graph of this function generated by software, and are asked to determine: a) the intervals where the function  $f : y = 10^x$  is increasing, decreasing, or constant; b)  $f(-20)$ ; c) the values of  $x$  for which  $f(x) = 0$ . We also aimed to identify any difficulties or misconceptions related to the concept of an exponential function.

Twenty-four 18-year-old high school students solved nine tasks as a part of a review of functions. This was the last task they solved, taking them approximately 10–15 minutes. We expected the students to determine the correct properties and values based on the equation, and to determine intervals and values only visually, without considering the type of a function. We also expected some misconceptions related to functions to occur.

Analysis of the students’ solutions revealed that some of our expectations had been met, and only 3 students answered all the subquestions correctly

by determining the correct properties and values. Additionally, some students managed to determine intervals and values only visually, as expected. From the results, as well as from the analysis of subsequent discussions among the students, it can be inferred that the visual impression of the graph significantly influenced their approach to solving the task and overshadowed their understanding of the exponential function ([1]). Difficulties also arose from working with an exponential function defined by a non-standard base (10) and a negative argument ( $-20$ ). Failure to understand how the scale on the axes affects the appearance of a graph can negatively impact a student's ability to work with graphs, equations, and their connections in other subjects, and reinforces the belief that mathematics is useless for solving real-world problems.

**Keywords.** Function, function representations, exponential function.

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# Differential equations driven by Choquet integral

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By considering the Choquet integral in the definition of Radon–Nikodym derivatives, we obtain the so-called Choquet derivatives, which are described in more detail in [4]. This natural generalization is used to define Choquet

differential equations. Such differential equations with respect to distorted Lebesgue measures were firstly studied by Sugeno in [5], and later investigated further by Torra and Negi in [2, 3]. We have studied these differential equations with respect to general fuzzy measures

$$\frac{\partial y(\tau)}{\partial \mu} = F(\tau, y(\tau)), \quad y(0) = 0. \quad (1)$$

In paper [1], we investigated basic properties such as the existence and uniqueness of solutions to the associated initial value problem, identifying conditions on the fuzzy measure and on the function  $F$  on the right side of Eq. (1). We also applied this theory to the modeling of biological processes with real measured data and obtained several interesting results, which will be presented in this contribution.

**Keywords.** Choquet integral, Choquet derivative, differential equations

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# Tangrams as a teaching tool in primary schools

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Tangram is a famous ancient Chinese puzzle. For primary school teachers as well as those working with children, it can serve as a versatile tool that is easy to make and is also attractive to children.

The Institute of Mathematics of the Slovak Academy of Sciences organized a series of workshops using tangrams as part of the Science and Technology Week for pupils in grades 3–6 of regular elementary schools. The core of the workshop was a fairy tale, which the pupils illustrated with a self-made tangram, see, e.g., [1]. The workshop program was the same in all the classes we visited and surprisingly, it was successful in all of them.

Our goal is to motivate KKM participants to use tangrams as often as possible or talk about them where they have the opportunity to influence work with school-age children. We will focus on practical experiences and observations from our workshops. We show that manipulating tangram pieces is an effective tool for practicing the language of mathematics, demonstrating various mathematical concepts, and fostering scientific thinking and inquiry skills. Tangram activities naturally allow for the development of interdisciplinary connections where they are not expected – they connect mathematics with language education, as well as with ethics and art classes.

**Keywords.** Tangram, geometry, interdisciplinary relationships, research skills.

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# The inequality among others

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In recent paper [1] the authors considered the inequality

$$a\Delta b \leq a + b - a \circ b \quad \text{for any } a, b \in m(\Sigma)$$

while providing relations among some classes of functions. Several pairs of operations  $(\Delta, \circ)$  have been presented. In the contribution, we present the above mentioned inequality in more general form

$$\varphi(a\Delta b) \leq \varphi(a) + \varphi(b) - \psi(a \circ b)$$

for any  $a, b$ , under fixed couple of operations  $(\Delta, \circ)$ , where  $\Delta, \circ: [0, \bar{y}]^2 \rightarrow [0, \bar{y}]$  and  $\varphi, \psi: [0, \bar{y}] \rightarrow [0, \bar{y}]$ . In what follows, the convexity of the considered functions plays a crucial role.

**Keywords.** Function, convexity, inequality.

**Acknowledgement.** This work was supported by VEGA 1/0243/23.

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# A unified approach to aggregation-based Hausdorff-type distances on finite sets

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The problem of measuring distances between finite sets arises naturally in many areas of mathematics and its applications. A classical example is the Hausdorff distance [3], valued for its geometric transparency and strong metric properties. At the same time, various applications motivate more flexible constructions in which the classical extremal operations are replaced by more general aggregation procedures. Such modifications have already been studied in several special cases, including averaged Hausdorff-type distances [1, 5] and related constructions appearing, for instance, in the work of Fujita [2] and others. However, these approaches have so far been treated mostly in isolated forms rather than within a unified general framework.

In this contribution, we study a general class of aggregation-based Hausdorff-type distances on finite sets. The motivating example comes from musical chords, which may be modeled as finite sets of tones and compared even when their cardinalities differ [4]. This leads naturally to modified set distances generated by inner and outer aggregation functions [6] together with suitable normalization and symmetrization steps.

Our main objective is to determine when such constructions preserve metric behavior. We derive necessary and sufficient conditions on the underlying aggregation operators and coupling mechanisms that guarantee the validity of the metric axioms. In particular, we identify structural conditions ensuring diagonal vanishing, definiteness, symmetry, and the triangle inequality, and we illustrate the theory on several concrete Hausdorff-type and averaged set-distance constructions.

Beyond the motivating musical setting, the proposed framework provides a unified view of operator-based distances between finite sets and clarifies how aggregation procedures influence their geometric and metric properties.

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# Zero memory backpropagation

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The paradigm of Deep Learning has traditionally relied on discrete functional compositions, where information is transformed through a fixed sequence of hidden layers. This presentation explores the emergence of *Neural Ordinary Differential Equations* (Neural ODEs), a novel class of models that interpret the depth of a neural network as a continuous regime. By parameterizing the derivative of the system’s state rather than the state itself, we go from the Discrete Residual Network (ResNet) logic,

$$\mathbf{h}_{t+1} = \mathbf{h}_t + f(\mathbf{h}_t),$$

to a continuous-time dynamical system defined by

$$\dot{\mathbf{h}}(t) = f(\mathbf{h}(t), t, \theta).$$

The core focus of this talk is the mathematical elegance of the “Infinite-Depth” limit. We demonstrate how numerical ODE solvers (such as Runge-Kutta and adaptive-step Dormand-Prince methods) replace traditional layer-wise forward passes. Furthermore, we discuss the *Adjoint Sensitivity Method*, which allows for gradient computation with constant memory complexity by solving a second, augmented ODE backwards in time. Finally, we present an application of this framework to spatiotemporal traffic dynamics in metropolitan networks, illustrating how the *Final Node* (the state at time  $T$ ) effectively represents a continuous transformation of the input manifold, offering superior flexibility in modeling irregularly sampled behavioral data.

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## What and how should we teach mathematics today? Round table

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The roundtable discussion will primarily focus on two topics:

1. *What enduring mathematical knowledge and skills should every secondary school graduate possess in the era of emerging disruptive technologies?*

Respected research indicates that greater emphasis should be placed on developing a deeper understanding of concepts, their properties, relationships, and applications. Particular attention should be given to fostering students’ critical thinking and creativity. Since achieving these goals requires time, it is essential to focus on the selection of key concepts, their properties, and problem-solving methods. In the discussion, we aim to address the question of which of these should form the core.

## 2. *How should a mathematics lesson change?*

It is well established that complex knowledge and skills are primarily developed through interaction with others. Many of us have experienced gaining deeper understanding of concepts, properties, or solution methods when explaining them to others. How can we create classroom environments in mathematics lessons where mathematically and problem-oriented interactions among students, as well as between students and the teacher, predominate?

How can we prepare students, teachers, parents, and the wider public for such changes?

**Keywords.** Mathematics education, teaching, technology.

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# Two-dimensional parametrization of primitive Pythagorean triples

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A Pythagorean triple  $(a, b, c)$  is a triple of positive integers which satisfies the Pythagorean equation, i.e.,  $a^2 + b^2 = c^2$ . If  $a, b$  are coprime, then the Pythagorean triple  $(a, b, c)$  is called a primitive Pythagorean triple (PPT).

There are several known methods of generating all primitive Pythagorean triples, usually starting from the triple  $(3, 4, 5)$ . One of them is Euclid's formula, which defines an isomorphic relation between the set of all primitive Pythagorean triples and the set of all primitive pairs  $(m, n)$  such that  $m, n$  are coprime positive integers of opposite parity and  $m > n$ . Hence, we can consider the primitive pairs corresponding to primitive Pythagorean triples, simplifying the problem from three-dimensional to two-dimensional.

Primitive Pythagorean triples are usually studied from one of the following points of view – as ordered triples [4], as right triangles with sides that form a PPT [2], and the points in 3D space [3]. Considering the primitive pairs, we can study them from similar points of view – as ordered pairs and as the points in 2D space.

Further, it is known that every primitive Pythagorean triple can be generated from the triple  $(3, 4, 5)$  using multiplication by unique number and order of three specific  $3 \times 3$  matrices, which yields a ternary tree of triplets. According to Firstov, there are exactly three generating trees of this type [1], and we can also generate them from the primitive pair  $(2, 1)$ , using the linear transformations defined by their  $2 \times 2$  matrices.

In this talk, we present some results concerning primitive pairs and we compare them to the known results concerning primitive Pythagorean triples. Namely, we show how many primitive pairs with a given component exist. Further, we consider Berggren's tree, which generates the most interesting geometric result, and we show that the three descendants, generated in Berggren's tree from any primitive pair, form a triangle. Moreover, all such triangles generated by the first transformation in Berggren's tree have one side parallel to  $x$ -axis.

**Keywords.** Primitive Pythagorean triple, Euclid's formula, primitive pair.

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# Integration of artificial intelligence into mathematics education: Practical insights, challenges and methodical experiences

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This contribution focuses on the possibilities of using generative artificial intelligence in mathematics education and its potential to support modern pedagogical approaches. It demonstrates how current AI tools can contribute to explaining abstract mathematical concepts, creating interactive tasks, and adapting instruction to the individual needs of students. The author presents experiences from her own pedagogical practice, particularly in the areas of personalized learning and the automation of teaching material preparation, which can facilitate the daily work of teachers.

Attention is also paid to the development of AI literacy, which includes the ability of students to verify the correctness of results, critically evaluate machine-generated solutions, and develop argumentation skills. At the same time, the contribution reflects on the limits of current technologies, primarily in the areas of logical accuracy, the reliability of outputs, and ethical issues associated with the use of artificial intelligence in the school environment. The outcome consists of practical recommendations for mathematics teachers seeking safe, effective, and pedagogically meaningful ways to integrate artificial intelligence into their teaching.

**Keywords.** Artificial intelligence, mathematics education, AI literacy, personalized learning, generative AI tools.

**GOLEM:  
game in mathematics courses  
at technical universities**

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This paper addresses the implementation of the GOLEM game (available online at [www.ralako.pythonanywhere.com](http://www.ralako.pythonanywhere.com)) in different institutional contexts. The game was integrated into the educational process in two courses at the Slovak University of Technology in Bratislava (STU) and the Technical University of Košice (TUKE) in its original form. The action research was conducted cyclically in two phases, reflecting ongoing experiences from the implementation and enabling iterative evaluation of its impact on the learning process.

Maintaining an identical game structure in both environments allowed for direct comparison. The results indicate a consistent increase in student engagement; enhanced use of mathematical language within student teams was observed, as well as an improved ability to cooperate in solving mathematical tasks. The deliberate creation of positive interdependence among students contributed to making cooperative learning more effective. The findings further suggest that cooperative game-based approaches can serve as an effective tool for supporting active learning in mathematics education, even when implemented across different institutional settings.

**Keywords.** Cooperative learning, game-based learning, GOLEM game, higher education, mathematics education.

**Acknowledgement.** This work was supported by KEGA 006TUKE-4/2024.

# Application of physical stimuli in physiotherapeutic practice

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This talk focuses on the presentation of physical mechanisms and technical parameters utilized in contemporary physiotherapy and medical rehabilitation. The work examines the interaction of various forms of external energy (electrical, mechanical) with the biological system and defines their impact on tissue structures from the perspective of applied physics.

The first part of the talk is devoted to electrotherapy, analyzing the effects of direct and alternating currents across various frequency spectra. Attention is directed toward the phenomenon of ionic polarization in galvanotherapy and the mechanism of overcoming the skin's capacitive resistance using medium-frequency currents (1 – 100 kHz) through interference fields.

Another area of focus is ultrasonotherapy, which is analyzed in terms of absorption coefficients depending on tissue density and frequency (0.8 – 3 MHz). In parallel, the physical characteristics of Shock Wave Therapy are defined, representing acoustic pulses with extreme peak energy (up to 100 MPa) and a steep pressure rise. The work mathematically and technically distinguishes between focused shock waves and radial pressure waves, evaluating their depth of penetration and energy density at the target focus.

The conclusion of the contribution presents the integration of shock wave mechanical energy, high-frequency diathermy (480 kHz), and the pharmacological effect of transdermal drug delivery. The biophysical benefit lies in the controlled change of cell membrane permeability and the thermal modulation of tissue metabolism.

**Keywords.** Physical modalities, electrotherapy, ultrasonotherapy, shock wave, TECAR, transdermal drug delivery.

## Generation Z and mathematics courses at universities

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Currently, increasing emphasis in managing the educational process is placed on reflecting the educational characteristics of Generation Z and on adapting and implementing active learning strategies.

This contribution builds on qualitative research conducted with university mathematics teachers across various technical universities, focusing on identifying key challenges and specific features of the educational process in this context. Based on these findings, a redesign of the educational process was carried out through the implementation of a game-based learning activity, the GOLEM game. This approach is grounded in cooperative learning, within which positive interdependence among team members was intentionally established. The results indicate that such a structured educational process contributes to more effective knowledge acquisition.

The contribution also highlights the possibilities of systematically adapting the educational process to the specifics of Generation Z and emphasizes the importance of cooperative learning, particularly through game-based approaches in university mathematics education. These findings provide the basis for further investigation of the GOLEM game in different institutional contexts.

**Keywords.** Generation Z, higher education, mathematics education, game-based learning, cooperative learning.

**Acknowledgement.** This work was supported by KEGA 006TUKE-4/2024.

# Back to the future: Decision-making using conditional probabilities

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This work analyses decision-making trajectories in complex systems, focusing on the impact of imperfect initial information and the subsequent role of Bayesian updating. Using a multi-stage decision tree model, the “pragmatic filters” that often dictate early-stage path selection are examined in the context of potentially masking superior long-term opportunities. By formalising these constraints, the model illustrates how initial resource scarcity can restrict the set of reachable alternatives in a stochastic environment.

Investigating the transformative power of posterior information encountered while executing a chosen path, the results demonstrate that such information can provide a critical signal for recalibrating conditional probabilities of success. Furthermore, the example shows that the value of information is not merely additive but transformative, fundamentally altering the decision-maker’s trajectory. Finally, the analysis confirms that recursive updates of conditional probabilities within a dynamic framework validate the necessity of information acquisition for long-term utility optimisation in high-complexity environments.

**Keywords.** Decision-making trajectories, Bayesian updating, multi-stage decision trees, pragmatic filtering, posterior information, conditional probability, stochastic environments.

**Acknowledgement.** This work was supported in part by the Slovak Research and Development Agency under the Contract no. APVV-22-0508 and no. APVV-18-0526, by the Slovak Grant Agency for Science under grant no. VEGA 1/0674/23, and the Cultural and Educational Grant Agency of the Ministry of Education, Research, Development and Youth of the Slovak Republic under grant no. KEGA 006TUKE-4/2024.

# Maxima and minima without differential calculus

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Problems involving finding the maximum or minimum value of a function have long arisen from various practical situations. Determining the extrema of a function belongs to the field of mathematical analysis, specifically within the study of a function's behavior. The fundamental tool for this is differential calculus.

However, there are also ways to determine the extrema of a function without using derivatives, for example by applying algebraic methods. Although these methods are not universally applicable, they can be advantageously used for certain types of functions. A special case is quadratic functions, where the extremum can be found by rewriting the function into vertex form – something high school students may encounter in mathematics classes. In some problems, the arithmetic and geometric mean inequality can be used. This topic is not part of the standard high school curriculum, but it often appears in Mathematical Olympiad problems and represents a useful tool, especially for gifted students. Another option is the discriminant method, which involves transforming the problem into solving a quadratic equation with a parameter and using the condition that the discriminant must be non-negative for real solutions to exist. Knowing multiple methods increases flexibility in problem-solving, supports the development of mathematical thinking, and enhances the ability to find different solutions.

# Mathematical Olympiad as a system for developing mathematical talent

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The contribution focuses on the Mathematical Olympiad as an important tool for supporting and developing mathematically talented youth. It is based on the Vojtech Bálint's book *History of the Mathematical Olympiad since its establishment in 1951* [1], published within the series Personalities of Slovak Mathematics. The book documents more than seven decades of its development, organizational changes, and pedagogical significance of this important mathematical competition.

The historical analysis shows that the Mathematical Olympiad is not just a competition, but a comprehensive system for working with gifted students, based on long-term preparation, problem solving, the development of proof-based thinking, and cooperation between teachers and the academic community.

The contribution emphasizes the importance of systematic preparation, organizational conditions, and pedagogical leadership in the development of mathematical talent. It also emphasizes that success in mathematical competitions is not only the result of an individual student's talent, but also of the quality of the environment in which this talent is developed.

**Keywords.** Mathematical Olympiad, gifted students, talent development, mathematics competitions, school effect.

**Acknowledgement.** This work was supported by the Cultural and Educational Grant Agency under grant KEGA 004KU-4/2025 Osobnosti slovenskej matematiky III – životné vzory pre budúce generácie<sup>2</sup>.

## References

- [1] Bálint V.: *History of the Mathematical Olympiad since its establishment in 1951*, Verbum, Ružomberok (2026) [in Slovak].

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<sup>2</sup>Personalities of Slovak Mathematics III – Life Role Models for Future Generations

## Program 24. Konferencie košických matematikov

### Programme of the 24<sup>th</sup> Conference of Košice Mathematicians

Štvrtok – Thursday 16. 4. 2026

- 12<sup>00</sup> – **Registácia účastníkov – Participants Registration**
- 12<sup>30</sup> – 13<sup>30</sup> **Obed – Lunch**
- 13<sup>30</sup> – 13<sup>35</sup> **Slávnostné otvorenie konferencie – Conference opening**
- 13<sup>35</sup> – 14<sup>25</sup> Hanč (ÚFV PF UPJŠ): *Artificial intelligence and data science as powerful tools for mathematics and mathematics education*
- 14<sup>25</sup> – 14<sup>45</sup> Jandera (ÚRIVP FBERG TUKE): *Zero memory backpropagation*
- 14<sup>45</sup> – 15<sup>05</sup> Škovránek (ÚRIVP FBERG TUKE): *Back to the future: Decision-making using conditional probabilities*
- 15<sup>05</sup> – 15<sup>35</sup> **Občerstvenie – Coffee-break**
- 15<sup>35</sup> – 15<sup>55</sup> Kószegyová (ÚMAT PF UPJŠ): *Two-dimensional parametrization of primitive Pythagorean triples*
- 15<sup>55</sup> – 16<sup>15</sup> Hurajová (ÚMAT PF UPJŠ): *A unified approach to aggregation-based Hausdorff-type distances on finite sets*
- 16<sup>15</sup> – 16<sup>35</sup> Puškárová (ÚMAT PF UPJŠ): *A generalized OWA operator and its application in image denoising*
- 17<sup>00</sup> – 18<sup>00</sup> **Memoriál profesora Jendroľa – Memorial dedicated to Professor Jendroľ**
- Fecková Škrabuláková (ÚRIVP FBERG TUKE): *A path, a trail, or a walk: The journey of a graph theorist*
- Tkačík (KI PF KU): *For community*
- Fecková Škrabuláková (ÚRIVP FBERG TUKE): *“Tento” graphs*
- Madaras (ÚMAT PF UPJŠ): *Memories of Mirko Horňák and Tomáš Madaras on Stano Jendroľ*

Fabrici (ÚMAT PF UPJŠ): *Stano Jendroľ – as I knew him*  
 Bača, Fecková Škrabuľáková (KAMaI Sjf TUKE, ÚRIVP  
 FBERG TUKE): *Letterarium*

18<sup>30</sup> – **Večera a „Face Colorings Algorithm“ – Dinner & “Face Colorings Algorithm”**

**Piatok – Friday 17. 4. 2026**

7<sup>00</sup> – **Registácia účastníkov – Participants Registration**

7<sup>15</sup> – 8<sup>25</sup> **Raňajky – Breakfast**

8<sup>30</sup> – 8<sup>35</sup> **Otvorenie 2. dňa konferencie – Conference opening – 2nd Day**

8<sup>35</sup> – 8<sup>55</sup> Hovana (KAMaI Sjf TUKE): *The inequality among others*

8<sup>55</sup> – 9<sup>15</sup> Cisko (ÚMAT PF UPJŠ): *Differential equations driven by Choquet integral*

9<sup>15</sup> – 9<sup>35</sup> Hannelová (KAMaI Sjf TUKE): *Generalising a Łukasiewicz-based representation of the discrete Choquet integral*

9<sup>35</sup> – 10<sup>05</sup> **Občerstvenie – Coffee-break**

10<sup>05</sup> – 11<sup>00</sup> Dományová (predtým Gymnázium Pavla Horova, Michalovce): *One problem – multiple paths: On motivation in mathematics*

11<sup>00</sup> – 11<sup>20</sup> Halušková (MÚ SAV): *Tangrams as a teaching tool in primary schools*

11<sup>20</sup> – 11<sup>40</sup> Tischlerová (Gymnázium Poštová, Košice): *Maxima and minima without differential calculus*

11<sup>40</sup> – 12<sup>00</sup> Tkačik (KI PF KU): *Mathematical Olympiad as a system for developing mathematical talent*

12<sup>00</sup> – 13<sup>00</sup> **Obed – Lunch**

13<sup>00</sup> – 13<sup>55</sup> Medová (KM FPVaI UKF): *Catalan numbers as a context for connecting combinatorial and computational thinking*

- 13<sup>55</sup> – 14<sup>55</sup> Semanišinová (ÚMAT PF UPJŠ): *What and how should we teach mathematics today? Round table*
- 14<sup>55</sup> – 15<sup>25</sup> **Občerstvenie – Coffee-break**
- 15<sup>25</sup> – 15<sup>45</sup> Buksárová (ÚMAT PF UPJŠ): *Analyzing an exponential function task*
- 15<sup>45</sup> – 16<sup>05</sup> Beránková (KAG PřF UP): *Mattecoach: Connecting support for pupils with the preparation of future mathematics teachers*
- 16<sup>05</sup> – 16<sup>25</sup> Kušnířová (Gymnázium Jána Adama Raymana, Prešov; VŠ DTI): *Integration of artificial intelligence into mathematics education: Practical insights, challenges and methodical experiences*
- 16<sup>25</sup> – 17<sup>20</sup> Babicová (KPEP PF KU): *AI assistants in mathematics education: Principles of didactic design and empirical findings*
- 17<sup>20</sup> – 18<sup>20</sup> Babicová (KPEP PF KU): *Multimodal generative AI in education: Designing AI assistants and creating learning content. Workshop*
- 18<sup>30</sup> – **Večera a spoločenský večer – Dinner & Party**

**Sobota – Saturday 18. 4. 2026**

- 7<sup>15</sup> – 8<sup>15</sup> **Raňajky – Breakfast**
- 8<sup>20</sup> – 8<sup>25</sup> **Otvorenie 3. dňa konferencie – Conference opening – 3rd Day**
- 8<sup>25</sup> – 9<sup>15</sup> Sýs (KPSK FI MUNI): *LLL: A tool for hard problems*
- 9<sup>15</sup> – 9<sup>35</sup> Nechvátal (FZO UNIPO): *Application of physical stimuli in physiotherapeutic practice*
- 9<sup>35</sup> – 10<sup>05</sup> **Občerstvenie – Coffee-break**
- 10<sup>05</sup> – 11<sup>00</sup> Kopfová (MU SLU): *Simple equations, complex dynamics*
- 11<sup>00</sup> – 11<sup>20</sup> Pócssová (ÚIAM FCHPT STU): *Generation Z and mathematics courses at universities*
- 11<sup>20</sup> – 11<sup>40</sup> Lascsáková (KAMaI SjF TUKE): *GOLEM: game in mathematics courses at technical universities*
- 11<sup>40</sup> – 11<sup>45</sup> **Záver konferencie – Conference closing**
- 11<sup>45</sup> – **Obed – Lunch**

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