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КНИГА СО АПСТРАКТИ

BOOK OF ABSTRACTS

СТРУГА, 27–30 ЈУНИ, 2023

STRUGA, JUNE 27 – 30 JUNE, 2023

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BOOK OF ABSTRACTS

Струга, 27 – 30 Јуни, 2023
Struga, June 27 – June 30, 2023

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University of Novi Sad and
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CONTENT

Пленарни предавања

Plenary Lectures

Some applications of the geometry of high-dimensional space-time in physics

KOSTADIN TRENČEVSKI*
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It is an old idea from A. Einstein and H. Poincare to consider the time as 3-dimensional, and it is also actual at the present time. The space should be separated: 3D space related to the translations and 3D space related to the rotations. Indeed, the existence of our observable space is not sufficient for existence of rotations. This 6D space is indeed at the same time a Lie group which is isomorphic to the group Spin(4), and can be approximated by the group of translations and rotations in 3-dimensional Euclidean space. The 3D time in order to preserve the Lorentz transformations is necessary to contain an addend of type $(\mathbf{v} \times \mathbf{r})/c^2$. This component gives possibility that this model of 3D time can be applied to the theory of atoms, and to give precise geometrical description of the electronic structure and the nucleus, and also to give description to the dark matter/ether. More geometrical applications can be done through the so called motions without inertia. Indeed, if a rotation is constrained, then it converts into translation as non-inertial motion. Conversely, if the translation is constrained, then it converts into rotation. If both translation and rotation are constrained if some conditions are satisfied, then the body will be time displayed. A step further, the basic four interactions (strong and weak nuclear forces, electromagnetic and gravitational forces) can be described as a consequence of the non-commutativity among the translations and rotations in corresponding Lie groups. An experimental verification can be found in case of the elementary particles electron and muon. The electron appears to be a circle with radius 1.41 fm and which rotates with velocity about $\alpha c/2$, $(\alpha = 137.036^{-1})$, and also has orbital velocity with the same velocity when it is not in orbit of an atom. In case of electron this model predicts the g-factor, which is index of the ratio of the electron's magnetic momentum to its spin angular momentum, is equal to $g_e = -2.00231930436183 \pm 40$, while the experimental value is $-2.00231930436170 \pm 152$. Analogous results are obtained by the Quantum Electrodynamics, but they are used for precise determination of the constant α. Moreover, in case of muon, this model predicts $g_m = -2.002331839358573$. The recent last experiment in Fermilab (2021) has found that $g_m = -2.0023318408 \pm 11$, while the Quantum mechanics predicts $g_m = -2.00233183620(86)$, which is 3 SD less than the experimental value.

Time frequency analysis in spaces with Hörmander metrics

STEVAN PILIPOVIĆ*
*University of Novi Sad

Short time Fourier transform (STFT) in $\mathcal{S}'(\mathbb{R}^{2n})$, $\mathbb{R}^{2n}$ is endowed with the Hörmander metric g_X, is analyzed and consequences on various classes of ΨDOs are given. Also (STFT) and frames over $\mathbb{R}^n$ with the Hörmander metric $(\mathbb{R}^n, g_x)$ are analyzed by the use of $Conf$- families

$$\varphi = \{\varphi_X, X \in \mathbb{R}^{2n} \text{or } \mathbb{R}^n\}.$$

The continuity properties of (STFT) on various spaces are also given.

This is a joint work with Bojan Prangoski from the University of Skopje

Amazing Journey through Active Learning and Math-Art Connections

VIOLETA VASILEVSKA*
*Utah Valley University, Orem, UT

Through her personal story and journey in mathematics, the presenter will address some of her educational experiences in the USA, both as a student and as a teacher. The presentation will display the presenter's struggles and growth, strengths and passions – through beautiful display of math.

Moreover, the presenter's interest in nurturing active classroom and student-centered activities, including ones that display connections with art, will be discussed.

The end of the presentation will highlight some of these activities used during the presenter's high school outreach program as well as her efforts to encourage diversity in STEM fields.

Посебна сесија

Special Session

АКАДЕМИК БЛАГОЈ ПОПОВ
100 години од неговото раѓање

ДОНЧО ДИМОВСКИ*
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Оваа година се навршија 100 години од раѓањето на Професорот Академик Благој Попов. Неговиот јубилеј е и јубилеј на математиката во Македонија. Роден 1923 година во Кочани, тој доживеа и 66 години од основањето на Универзитетот "Св. Кирил и Методиј" и 47 години од основањето на МАНУ, чиј член е од нејзиното основање. Од 1967 до 1969 година беше ректор на Универзитетот, а од 1980 до 1983 година беше потпрецедател на МАНУ. Благој Попов беше вклучен во наставата на Универзитетот "Св. Кирил и Методиј" уште од неговото основање. Може слободно да се каже дека тој, заедно со професорот Митриновиќ, ја донесе математичката анализа во Македонија.

Благој Попов е математичар посветен на диференцијалните равенки. Тој се школуваше и израсна во научник токму во времето кога диференцијалните равенки станаа најважна математичка дисциплина. Тоа беше времето на првата електротехника (системи линеарни диференцијални равенки), ракетна техника (равенки со променлива маса), нуклеарна енергија (специјални функции и равенки на математичката физика), итн.

Кратки соопштенија

Contributed Talks

On the development of creativity in teaching mathematics

VOJISLAV ANDRIĆ*
*Mathematics club "Diofant"-Valjevo

The basic demand of employers (in the broadest sense of the word) towards educators today is undoubtedly the innovation of students, so the educational system is expected to train young people to creatively perform their, usually flexibly defined, professional duties, regardless of whether these are jobs in the fields of economy, finance, administration, education or some other activities. That is why creative abilities, initiative and cooperation are personality traits on which the innovative behavior of each individual in performing their professional tasks significantly depends.

Developing creativity through the teaching process is not impossible, but not an easy task either. At the same time, considerable achievements in this area are rightly expected from mathematics as a teaching subject that has good teaching continuity, but also the possibility of wide application in everyday life. However, fragmentary studies of teaching practice show that in schools, the problem of developing creativity in mathematics teaching (and in general) is not given enough attention.

The aim of this talk is to direct the listeners' attention to this problem, point out the psychological and didactic foundations of creativity, show some problem situations in which students' creative expression is possible, emphasize the role of dialogue, games and research work of students as active teaching methods for encouraging students' creativity and suggests certain principles that should be applied in order to obtain as a result a fruitful, age-appropriate students creation.

Clustering via Coherent Network Partition

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†Max Planck Institute of Plant Physiology and
University of Potsdam, Department of Bioinformatics, Golm

Coherent partition of a graph G is defined as a vertex partition that corresponds to a partition composed only of disconnected subgraphs in the complement of G. An optimal coherent partition is defined as a coherent partition induced by an edge cut with the smallest number of edges. Here we characterize some relations between coherent and other types of partitions, including: clique partitions, biclique partitions, and modular graph decompositions. We show that the problem of finding optimal coherent partition in graphs reduces to a problem of finding optimal coherent partition in prime graphs. In addition, we demonstrate an application of coherent partitions in systems biology by introducing a family of parameter-free algorithms to efficiently predict protein complexes in protein-protein interaction networks.

Classes of Numerical Semigroups with Embedding Dimension 3: An algorithm for Computing the Frobenius Number

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In this paper we present an algorithm for computing the Frobenius number of a numerical semigroup G with embedding dimension equal to 3 such that

$$G = [n; \{1, j], \{b_i, b_j\}], \;\; GCD(n, i) = GCD(n, j) = 1, n < x < y$$
$$x = b_i n + i \quad \text{and} \quad y = b_j n + j$$

As a consequence, we give an algorithm for determining the set F of all numerical semigroups with embedding dimension 3, given its multiplicity n and the corresponding remainders i and j of the generating elements x and y modulo n, i.e. the set

$$\mathcal{F} = \{[n; \{1, j], \{b_i, b_j\}] \mid b_i, b_j \in \mathbb{N}, n < b_i n + i < b_j n + j\}$$

Trees with minimum weighted Szeged index are of a large diameter

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& FAMNIT, University of Primorska, Koper

The weighted Szeged index (wSz) has gained considerable attention recently because of its unusual mathematical properties. Searching for a tree (or trees) that minimizes the wSz is still going on. Several structural details of a minimal tree were described. We present a surprising property that these trees have maximum degree at most 16, and as a consequence, we conclude that these trees are of large diameter.

Time Series Analysis and Forecasting using ARIMA models

ANA ATANASOVA*, LIMONKA KOCEVA LAZAROVA†, PETRE LAMESKI‡

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Time series analysis represents a set of methods that enable the exploration, understanding, and prediction of sequential data.

The exploratory data analysis includes checking if there are some patterns in the data, such as having trends, seasonality, irregular fluctuations and if the series is stationary or not. Understanding the characteristics of the time series is crucial for selecting appropriate analytical approaches. The essential steps in the time series analysis are the data processing techniques which transform the data in a way that allows modelling algorithms to train better models and converge faster. In the paper some basic analytical models such as autocorrelation and decomposition are used. We also give an overview of popular forecasting techniques such as ARIMA models, seasonal decomposition models or exponential smoothing models. These methods capture the underlying patterns and relationships within the data, allowing for reliable forecasting and anomaly detection.

The broader applications of time series analysis across diverse fields, including finance, economics, weather forecasting, energy demand prediction, and healthcare are considered also. The ability to uncover temporal patterns and predict future trends empowers decision-makers, risk management, and operational planning.

An algorithm for a class of (n, j, k)-good matrices related to numerical semigroups with embedding dimension 4

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In this paper we recall definition of the notion of an (n, j, k)-good matrix. For given natural numbers n, j, k where $1 < j, k < n$ we present an algorithm for obtaining all (n, j, k)-good matrices. This implies that for n, j, k as above, there are only finitely many (n, j, k)-good matrices.

Analysis of properties of some quasigroup equations

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Quasigroups are algebraic structures that are increasingly used in cryptography today. Research and application of these cryptographic primitives is quite popular due to their specific properties. What is interesting about quasigroups is that their number grows enormously depending on the order of the quasigroup. Their application in block ciphers is quite convenient, since with the help of simple transformations, quasigroups can provide good encryption, while requiring low performance. In this paper, the construction of two types of quasigroup equations will be shown and we will analyze the quasigroups that are solutions of the given equations versus those quasigroups that are not solutions of the equations.

Common fixed point theorems for pairs of self-mappings on (3,2)-W-metrizable spaces

TOMI DIMOVSKI*, DONČO DIMOVSKI†

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In this paper, we prove the existence and the uniqueness of a fixed point for pairs of self-mappings in (3,2)-W-metrizable spaces analogous to Tf contractions in ordinary metric spaces and we obtain two corollaries.

Some fixed point theorems for rational type contractions

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Fixed point theory begins with the Banach contraction principle which was firstly given by Banach in "S.Banach, Sur les operations dans les ensembles abstraits et leurs applications aux equations integrales, Fund. Math., 3 (1992), 133–181." There are important applications of fixed point theory in mathematics, computer science, game theory, economics. A lot of researcher generalized Banach contraction principle in different directions. In " J. J. Nieto, R. Rodriguez-Lopez, Contractive mappings theorem in partially ordered sets and applications to ordinary differential equations, Order, 22 (2005), 223–239", Banach contraction principle extended to partially ordered metric spaces. Partial metric which is a generalized notion of metric introduced by "S.G.Matthews, Partial metric topology, in: Proc. 8th Summer Conference on General Topology and Application, in: Ann. New York Acad. Sci., vol. 728, (1994), 183–197." Matthews proved that Banach contraction principle is valid in partial metric spaces and the obtained results applied to program verification. In " D.S.Jaggi, Some unique fixed point theorems, Indian J.Pure Appl. Math. 8 (1977), 223-230", fixed point results for rational type contractions have been obtained. These obtained results extended to partially ordered metric spaces in " J.Harjani, B. Lopez, K. Sadaragani, A fixed point theorem for mappings satisfying a contractive condition of rational type on a partially ordered metric space, Abstr. Appl. Anal., 2010 (2010), 19071." In this work, we extend many fixed point theorems for continuous contractions of rational type to the framework of those that are orbitally continuous. Moreover, we get extensions of metric fixed point results to the framework of partial metrics.

The shearlet transform and asymptotic behavior of Lizorkin distributions

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The shearlet transform is a powerful technique used for achieving effective representation of high-dimensional signals. In a certain sense, shearlets behave for high-dimensional signals as wavelets do for one-dimensional ones. The continuous shearlet transform theory for square integrable functions was developed by Kutyniok and Labate. Recently, Bartolucci, Pilipović and Teofanov extended and analyzed the shearlet transform and the shearlet synthesis operator in the Lizorkin type spaces of test functions and distributions.

In this paper we study the asymptotic behavior of Lizorkin distributions through the shearlet transform. We prove several Abelian and Tauberian results that characterize the quasiasymptotic behavior of Lizorkin distributions in terms of their shearlet transform.

Best proximity point results in the orthogonal metric spaces

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From the moment when the concept of the orthogonal set appeared in 2017, it become an interesting topic for research. Many authors investigated the uniqueness of best proximal point results in different types of metric space (X, d) where X is an orthogonal set and d is a metric on X. Investigation of those results goes in two main directions. The first type of investigation direction deals with different metric spaces, such as standard metric space, b-metric spaces, metric-like spaces, b metric-like spaces, modular spaces, etc. The second direction deals with different types of contraction. Firstly, we present some necessary definitions with many examples for a better understanding of the concept of the orthogonal set. After that, we give an overview of some results in this field.

History and applications of nonlinear eigenvalue problems

Dragana Gardašević*
*The Academy of Applied Technical Studies, Belgrade

Matrix analysis is a powerful tool in the study of modern phenomena and in the application of mathematics in science, engineering, medicine, economics, physics and other scientific disciplines. The eigenvalue analysis, due to its numerous applications, represents an attractive area of applied mathematics. During the 20th century, various researches on the topic of eigenvalue theory were carried out. Hence the idea of this paper is to give an overview of the history of the origin of this type of problem, as well as its applications, primarily in engineering, which would make this paper useful as a starting point for further studies of these specific problems. In addition, the goal of this paper is to help students of engineering sciences in understanding the application of some mathematical methods in engineering, providing a solid basis for further dealing with nonlinear eigenvalue problems.

Determining value at risk using extreme value theory on a financial data set

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Extreme value theory has a wide range of applications. The paper considers application of extreme value theory in the area of financial flows. Our data set has been processed using two different approaches, block maxima and peak over the threshold method. We compare the obtained results for the risk measures and draw conclusions on the behavior of the financial flows for different time intervals.

Measuring and improving the level of statistical literacy of first-year undergraduate biology students

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With the increasing availability of data in biology research, biology students must be able to analyze and interpret this data to accurately understand biological phenomena. Statistical literacy is the ability to understand, interpret, and critically evaluate statistical information in order to make informed decisions and judgments. The research questionnaire based on Gal (2002) and Watson and Callingham (2003) models for statistical literacy is conducted to determine the level of statistical literacy of undergraduate biology students at Faculty of Natural Sciences and Mathematics in Skopje, before taking the Statistics course. The results of this study are used for improving methods of teaching statistics among these students. Final test results after taking the Statistics course are analyzed, in order to evaluate the effectiveness of teaching methods.

Textual tasks for empowering students thinking and understanding

VALENTINA GOGOVSKA*
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Textual tasks can be a powerful tool for empowering students' thinking and understanding. Development of thinking and in particular development of mental qualities – width, depth, independence, logic, mobility, concreteness, criticism, speed, creativity, target orientation, generalisation, insight, and more, is one of the most important and consistent goals and objectives of math teaching.

Simultaneously, the degree to which this aim is fulfilled determines the level and effectiveness of the teaching process for the overall development of the student's personality. An important psychological and pedagogical condition for the development of quality of thinking is student's reflexive understanding of thinking as a process and their own mental capabilities.

This work attempts to promote the use of textual tasks during everyday mathematics classes, especially during classes for exercises through a few examples. Well-chosen examples not only improve and empower the process of doing mathematics, but also stimulate the process of creative thinking and motivate student's individual development in their current learning and understanding, thus leading to the formation of intellectual reflection. Encouraging this kind of thinking is an effective way to teach students to challenge themselves and get deeper understanding and getting long-lasting structural knowledge.

In conclusion, textual tasks are a powerful tool for empowering students' thinking and understanding.

Mathematics is Lovely

ELENA HADZIEVA*
*University of Information Science and Technology "St. Paul the Apostle"

This presentation is intended for wider audience as by its nature is a popular talk, for listeners of different levels of mathematical knowledge. It will promote the qualities of mathematics related to its artistic, aesthetic, and "supreme" beauties, which include balance, order, correctness, exactness, truth, and "beautiful" emotions inspired (like admiration, excitement, happiness, thankfulness, curiosity, respect, relaxation). The natural connections of mathematics and art, mathematics and music, mathematics and patterns, mathematics and design, will be presented. The main objective of this talk is to widen the views of teachers at all levels of education and to motivate them to spread further the beauties of mathematics, bringing students into mathematical aspects they were most likely unaware of.

Interpolation methods on triangular meshes

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A triangular mesh is a 2-dimensional combinatorial manifold or simplicial complex M, whose geometry is defined using a piecewise linear function $f : \Omega \to \mathbb{R}^3$ from a $2d$ domain Ω with the same topology as M.

Given a set of static control points $V_S \subset M$ and a set of moving points $V_M \subset M$, an optimal interpolation is one that minimizes the Dirichlet functional

$$E_D(f) = \int_\Omega \|\nabla f\|^2 \, dx.$$

where ∇f is the gradient operator. f also minimizes the total curvature of the resulting triangular mesh. We present two solution methods.

The first method is based on the discrete Laplace equation on a mesh given by

$$\Delta f = 0$$

where $\Delta = \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2}$ is the Laplace operator. The second method is known as thin plate spline and is based on using Green functions or radial basis functions to represent f.

Both methods lead to the solution of an over-determined system of (sparse) linear equations in the least squares sense, which are solved using direct or iterative methods. We discuss their implementation in the Math.NET Numerics code library and their computational efficiency. We demostrate applications to 3d graphics including surface deformation, free boundary parametrization and hole closing.

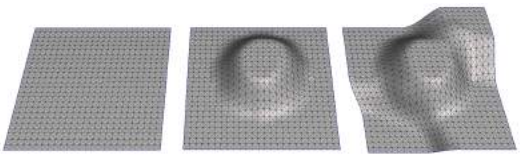

FIGURE 1. Deformation of a plane

"Are you ready?" – Generation Z is here

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We live in the age of rapid developments in modern technologies. These transformations have impact on all social spheres in today's world. Different personal beliefs, social environment and generational affiliation are reflected in behavior, communication, attitudinal and motivational goals. Economic conditions, life values, cultural context of the environment, technological, educational and social possibilities in collective and individual world can lead to different needs and strategies of behavior even within the framework of the "generation" itself.

First we will give a few main characteristics for "XYZ - generations" according to the modern, classic concept suggested by the American authors, William Strauss and Nov, keeping them in mind: current/future teachers born in the X/Y generation (X / 41–55 years old, Y / 26 to 40 years old) and students born in the Z/Alpha generation (Z /5 to 25 years old and Alpha are those born after 2015) and their specific on Balkan countries, especially in Macedonia (Results obtained from our conducted research on the topic "How much are our students dominant representatives of the Z-generation in primary and secondary education"). After we "look" in consumer perspective and psychological observations for generation Z, we will propose concrete strategies and work techniques on how teachers should work with them in order to build the new citizens of the 21-st century world.We will conclude with possible flows and aspirations of our approach as well as a brief on how these students can build certain skills to prepare for higher education, especially in mathematics. Generation Z students are increasingly striving for independence, valuing ideas, innovation and entrepreneurship - they are transforming the education system in many aspects which will require educators to adapt and handle these changes. And we are here to help them!

Improving Mathematical Literacy with a Modification of the Thought Process through Critical Thinking, Non-routine Problems and Motivation

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Mathematics is often perceived as an abstract and incomprehensible subject, and it is accompanied by feelings of anxiety and apathy among students. In the case study of Macedonia, we can undoubtedly look for the reasons in the following triad: society, parents and the teacher-student relationship. Today's modern society requires citizens with new skills and knowledge needed to create new technologies and innovations; citizens with willingness to solve challenges in unknown circumstances. The key is quality education that will produce competitive individuals in the labor market, with competencies for reading and exchanging information, using practical knowledge and acquired skills, as opposed to reproducing factual memorized knowledge. Developed countries reward individuals not for what they know, but for what they can do with their knowledge. PISA's research indicates that the quality of educational systems and policies is tightly linked to teachers. Teachers pave the pathway for students to answer the most important questions in education: "What do I know?" and "What can I do with my knowledge?" We should not forget the motivational component as well.

For our paper, we are particularly interested in one of the three areas of PISA: mathematical literacy with an emphasis on the novelty of 2018 - the global competence for the assessment of knowledge in the field of innovation. We understand the urgency to research how well students are able to apply their own knowledge, in our contest mathematical literacy, and we recognize the role that mathematics brings in building constructive, engaged and reflective citizens. The aim of the paper is to provide conceptual solutions to support students' development of competences

for solving problems that include the ability to transfer knowledge, creative and critical thinking, through solving non-routine problems from different perspectives, argumentation and in-depth understanding of the problems' structures.

Bloom's taxonomy plays a vital role in achieving our goals and it evolves around the following stages: applying, analyzing, evaluating and creating. The teacher here is a coordinator and motivator in students' learning and the process of creating new ideas, products, and new ways of understanding things using previous knowledge. Instead of imposing an "unknown" language, they should try to "play" the game together through students' interests. Through critical opinion as a process in which the subject analyzes facts, looks for a connection between them, evaluates them and synthesizes conclusions – let us participate in the "creation" of the new modern order.

Forecasting the inflation in the Republic of North Macedonia by using ARIMA model

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Inflation modeling and forecasting are crucial for the economies of all countries, particularly developing ones. This paper aims to forecast inflation in the Republic of North Macedonia. The chosen methodology for econometric modeling of inflation in the country is the Box-Jenkins approach, utilizing an ARIMA model. The analyzed time series focuses on the consumer price index (CPI) with a base year of 2010. Data for this analysis has been obtained from the State Statistical Office. As of the time of modeling, the latest available observation for inflation was from September 2022. The time series consists of 249 observations, with a monthly frequency, covering the period from January 2002 to September 2022. The analysis reveals that the model accurately predicts inflation for the first two months outside the sample period, with a difference of only 0.1 and 0.5 percentage points between actual and predicted inflation, respectively. Consequently, it can be concluded that the Box-Jenkins methodology yields highly accurate inflation forecasts for the Republic of North Macedonia, specifically within the first two months outside the sample period of the time series.

Unlocking Mathematical Proficiency: Exploring Digital Platforms as Catalysts for Overcoming Learning Barriers

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This research explores the utilization of digital platforms as a means to overcome learning barriers in mathematics for students with learning difficulties, particularly dyscalculia and dyslexia. The study focuses on strategies that connect mathematical concepts with real-life situations and world problems, such as green math and financial math. Additionally, it investigates the effectiveness of peer support through math debates and interdisciplinary connections with other STEM subjects. Digital platforms offer various advantages, including enhanced visualization, dynamic learning experiences, and independent exploration of mathematical concepts. By contextualizing math within real-world contexts, students with learning difficulties can develop a deeper understanding and practical application of mathematical principles. The incorporation of peer support through math debates promotes collaborative learning environments, facilitating confidence-building, critical thinking, and problem-solving skills. Connecting mathematics with other STEM disciplines provides students with a holistic perspective, emphasizing the interdisciplinary nature of scientific knowledge. The research is conducted in primary education settings, specifically at OOU "Ilinden" Kriva Palanka, OOU "Vera Jocic" Gazi Baba - Skopje, and OOU "Ljuben Lape" Skopje. The findings of this study contribute to the existing knowledge on leveraging digital platforms to enhance mathematics education and provide valuable insights into strategies for overcoming learning barriers faced by students with dyscalculia and dyslexia, ultimately promoting engagement, understanding, and application of mathematical concepts in real-world contexts.

Early support for the development of a child with autism spectrum to mathematical activity

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The article concerns stimulating the development of children with autism spectrum in shaping their mathematical skills. The author presents the results of empirical research conducted in special education institutions. The research group consisted of teachers and specialists implementing early support programs for children on the autism spectrum and their families.

Solution of the Björling Problem for Spacelike Surfaces in $\mathbb{L}^4$

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Björling formula is a way to obtain a minimal surface using a curve called the core curve. Then the problem is considered in the Lorentz-Minkowski space for maximal surfaces and also timelike minimal surfaces. Also it is possible to deal with the problem in four dimensional spaces. Now using the Björling formula we obtain new examples of the spacelike zero mean curvature surfaces in $\mathbb{L}^4$ and give the explicit parametric equations of the surfaces.

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Constructing mathematical didactics games by children of preschool age

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One of the tasks of pre-school education is to support the intellectual development of children along with mathematical education. Mathematical education is one of the most difficult areas of education. Maths is often not only non-supportive in terms of child's intellectual development, but in some children it can also impede or distort their personalities. As early as in pre-school, children often experience failures, which may cause real drama. Consequently, many children are afraid of Maths and tend to avoid, by all means, any out-of-school situations associated with it. Thus, how to organise Mathematics so that they bring the desired results? It seems that to help the child reach the level of curricular requirements, often a simple introduction of innovative methods, suited to the child's abilities and difficulties it experiences, would suffice. One of them is the method of constructing didactic games. The article presents the construction of didactic games by 6-year-old children from a kindergarten in the Siedlce city.

Reflective learning of mathematics teachers from the primary and secondary schools of the Republic of North Macedonia

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In the paper "Reflective learning of mathematics teachers from the primary and secondary schools of the Republic of North Macedonia" it is about the reflection that should be practiced often. Teachers who practice reflection on their teaching can better follow the waves of change. They face reality almost daily that is related to their basic work: violence, global pandemic, inequalities, rapid changes, adaptations and so on. The shift to blended and online learning as a result of Covid-19 in 2020 is one such example. Then even the most experienced teachers found themselves in unknown waters. Reflection on teaching and collaboration between teachers were key skills for rapid adaptation in the time of Covid-19. The paper also presents the findings from research on: the opinion of mathematics teachers about the need for reflection on their teaching; the opportunity to include reflection as part of their own path to professional development, the frequency of practicing reflection and the strategies they use for reflection. Based on the interpretation of the results of the research, the paper will give suggestions for improving the culture of practicing teaching reflection among mathematics teachers in primary and secondary schools of the Republic of North Macedonia.

Creating game for solving mathematical textual tasks

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Modern mathematical methods in primary school teaching, point to different possibilities in managing the most crucial aspects in primary education, such as developing creative thinking and creative skills of students. One approach to this problem is engaging the students in solving textual tasks, as a form of creative work. In this paper we present one innovative method for solving such tasks. Namely, to achieve greater success in solving, students are motivated through playing a game. We developed a special game named "We create treasure finding maps" to be used in solving all textual tasks for primary school mathematics. Students solve the specific task simply by playing the game. In this way students are presented with the original approach that is opposite to the general belief about solving textual tasks as difficult, boring and reserved for the "special ones". With this approach, students are having fun playing the game, while at the same time they are finding the solution to the task. We showed that this method enables participation of all students regardless of their mathematical knowledge and background. The results are given before and after application of this approach. The game is tested in 2022 with the third grade students.

Solving realistic tasks with the help of mathematical modeling among 4th graders

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Mathematics is a rich and interesting discipline for research. It provides many ideas and tools that are effective in solving problems that arise in other fields. With the knowledge of certain skills, a way to solve problem situations is found. Ideas, knowledge and skills should be encouraged from an early age in students. Mathematical modeling is an activity that appears as a set of thoughts when solving realistic tasks among students from lower grades in primary education. This paper deals with that topic.

After a series of consultations, conversations, surveys among us, teachers, we decided to conduct a survey among the students of the 4th grade. In support of this interest, research was carried out to solve realistic tasks among students from the Elementary School "St. Kliment Ohridski" in Ohrid. The analysis of these studies gives a special picture of the importance of introducing mathematical modeling in everyday teaching practice.

The paper consists of four parts: theoretical approach to the problem, research methodology, analysis and interpretation of the results and conclusion. Some discoveries about learning and teaching mathematical modeling in primary school are presented here. The goal is to implement these conclusions and ideas in the overall education of the teacher and the student.

A Comprehensive Analysis of Students' Performance in the State Matura Mathematics Exam

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The state matura is external final examination that is conducted at the end of four years of secondary education. Its goals include, among others, monitoring and controlling the quality of secondary education, as well as selecting candidates who compete for admission to higher education. In this paper, the authors analyze the students' achievements in the mathematics exam by considering various factors, such as the type of completed secondary education, gender, and nationality of the examinees. Furthermore, the students' performance in four mathematical areas is examined: Algebra, Geometry, Analytical Geometry and Progressions. The results obtained in the June examination session were compared across three school years: 2018/19, 2020/21, and 2021/22.

A note regarding some fuzzy SSPO mappings

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In this paper we will introduce the concept of fuzzy SSPO irresolute continuous mappings, fuzzy SSPO irresolute open mappings, fuzzy SSPO irresolute closed mappings as well as the concept of fuzzy SSPO homeomorphism. We will prove that this class is independent from other forms of fuzzy weaker continuous mappings. We will study some of their properties and examine their relation with other forms of fuzzy continuity.

N-tuple orbits and n-tuple weak orbits tending to infinity

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In this paper we give a sufficient condition for a given n pairwise commuting bounded linear operators on an infinite dimensional Banach space X, which will imply that the space contains a dense set of vectors each with a corresponding n-tuple orbit tending to infinity. The same condition is sufficient to imply that the product of X and its dual space will contain a dense set of pairs each with a corresponding n-tuple weak orbit tending to infinity.

Introduction of the concept of probabilistic algebras

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The notion of probabilistic algebra is introduced, which relies both on Universal algebra and on Probability theory.

Let A and B be non-empty sets, and let D_B be the set of all discrete distributions on B. A probabilistic mapping from A to B is a mapping $h : A \to D_B$. Every probabilistic mapping from A^n to A is a probabilistic (n-ary) operation on A. Probabilistic algebra is a pair (A, F) of a set A and a family F of probabilistic operations on A. "Ordinary" algebras can be considered as a special type of probabilistic algebras. If F consists of single binary probabilistic operation f on A, then (A, f) is called probabilistic groupoid.

In this paper, we deal with the class of probabilistic groupoids, regarding identities, subgroupoids, direct products and homomorphisms.

Matrix representation of Bilinear Multivariate Quadratic Quasigroups of order 2^n

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The quasigroup $(\{0,1\}^n, *)$ is called a Bilinear Multivariate Quadratic Quasigroups (BMQQ) if the quasigroup operation can be represented by a vector valued Boolean function $f(\overrightarrow{x}, \overrightarrow{y}) = \overrightarrow{z}$, where for some constants c_k, a_{k_i}, $b_{k_i} \in \{0,1\}$, $k, i = \overline{1,n}$

$$z_k = c_k + \sum_{i=1}^{n} a_{k_i} x_i + \sum_{i=1}^{n} b_{k_i} y_i + \sum_{i=1}^{n} \sum_{j=1}^{n} d_{k_{ij}} x_i y_j \tag{1}$$

But, not every Boolean function yields a quasigroup. In this paper we determine the relation between the coefficients, so that the above inequality defines a quasigroup. Moreover, we analyze the relationship between the coefficients when the quasigroup is commutative and associative.

Fuzzy ideals in $(n+k, n)$-semigroups

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The notion of fuzzy sets, introduced by Zadeh, is a fundamental mathematical concept that deals with uncertainty. It has many applications in a wide range of mathematical areas, as well as in engineering and economics. A fuzzy subset μ of a nonempty set S is a function μ of S into the closed interval $[0, 1]$. For all $x \in S$, $\mu(x)$ is called the grade of membership of x. If $\mu(x) = 1$, then we say that x is fully included in S, and, if $\mu(x) = 0$, then we say that x is not included in S. If the set S bears some structure, one may distinguish some fuzzy subsets of S in terms of that additional structure. Fuzzification of algebraic structures was done by Rosenfeld by introducing the notion of fuzzy (left, right) ideal in a groupoid and the notion of fuzzy subgroup of a group.

Motivated by the study of fuzzy ideals in semigroups in some papers of Kuroki, McLean and Kehayopuly, we extend these notions on vector valued semigroups. We present the notion of fuzzy subset of vector valued groupoid (semigroup) **S**, as well as fuzzy subgroupoid, fuzzy subsemigroup, fuzzy i-ideal (ideal) of vector valued groupoid (semigroup). Suitable examples will be presented as well. Further on, we define prime and fuzzy prime, semiprime and fuzzy semiprime subsets of vector valued groupoids and investigate their properties, as well as properties of fuzzy subsets of vector valued semigroups. We introduce the notions of vector valued bi-ideal and fuzzy bi-ideal on a vector valued semigroup and investigate some of their properties. We characterize the Green's relations $\mathcal{J}_i$ on a vector valued semigroup **S** in terms of fuzzy subsets. Green's relations $\mathcal{J}_i^F$ on **S** are suitably defined and it is shown that they coincide with the relation $\mathcal{J}_i$ on **S**.

Sensitivity analysis of stochastic (s, S) inventory model with Poisson demand process and exponential lifetimes

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In [L. Liu, Operations Research Letters 9 (1990), pp. 161–167] a stochastic (s, S) inventory model with Poisson demand process and exponential lifetimes is proposed. Based on those results, we give an algorithm for finding optimal values of the parameters s and S. The algorithm is tested on numerical examples for different values of the model parameters. Also, theoretical results are obtained for the sensitivity analysis of the optimal values depending on the change of some of the parameters of the mentioned inventory model.

Chain separatedness in a family covering space

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The paper gives a generalization of different kind of separatedness and chain separatedness of a family covering space i.e. a space that is more general than a topological space and it consists of a set and a family of coverings of the set. In these spaces, the notion of pair of chain separated sets is defined and their properties are presented. Other notions of topological spaces to spaces are also generalized, such as types of spaces (discrete, totally separated, totally chain separated, totally weakly chain separated etc.) and other notions such as an isolated point. Most of the claims and proofs in the paper are analogous to topological level. A number of statements are not analogous, are analogous just in one direction or cannot be generalized to the space level. Three examples for spaces are given, to be shown that three statements do not hold in the converse direction.

Left and right G-outer inverses

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In order to propose weaker versions of G-outer inverse, left and right G-outer inverses are presented as new generalized inverses. The sets of all left and right G-outer inverses are described. Using left and right G-outer inverses, we introduce new partial orders and establish their relations with minus partial order and space pre-order. We apply these results to present and investigate left and right G-Drazin inverses of square matrices and corresponding partial orders.

Optimization problems in high school classroom

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Optimization is determining the best result of a process, in accordance with given conditions. In mathematics, it is determining the minimum or maximum of a function by which we describe the process. We optimize our activities every day. Maximizing benefits, minimizing costs, saving time, and other forms of optimization are in everyone's interest daily. Therefore, modeling and optimization techniques would be of great benefit to young people, especially high school students.

In this paper, several examples of different types of optimization problems intended for high school students are presented. The given examples can be solved using different arithmetic or algebraic strategies, depending on the age of the students. According to the goals of the subject of Mathematics, this type of problems corresponds to the application of the learned mathematical concepts and that is why we believe that they are interesting for most students. Moreover, we believe that the challenges of optimization problems would be of great importance for students' motivation in studying the subject of Mathematics.

Scale Invariant Stochastic Gradient Method with Momentum

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Optimization in noisy environments arises frequently in applications. Solving this problem quickly, efficiently, and accurately is therefore of great importance. The Stochastic Gradient Descent (SGD) method has proven to be a basic and an effective tool which is flexible enough to allow modifications which improve its convergence properties. In this paper we propose a new algorithm which combines the SGD with a modified momentum term using a two-point step size estimation in the Barzilai-Borwein framework. We analyze the convergence properties of the algorithm. Numerical experiments are performed on a standard set of test-functions in a noisy environment. We demonstrate that the proposed method is scale invariant and that it outperforms the "vanilla" SGD with momentum.

Generalization of the Levin-Stečkin inequality

JURICA PERIĆ*
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In this talk we give generalization of the Levin-Stečkin inequality as a result concerning difference of integral weighted arithmetic means. The results are obtained using Green function. First we give results for general weighted functions, and then with conditions on weighted functions usually associated with the Levin-Stečkin inequality.

Some modifications of the autoregressive component in modeling non-negative time series of counts

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Modeling time series of counts is a challenging task in many fields of science. The important part in that research is devoted to the integer-valued autoregressive (INAR) models. INAR models are composed of two components: the survival and the innovation process. The survival process is the autoregressive component of the INAR models. The focus of our research is based on proposing different modifications of this process. As it can be seen on real data sets, the influence of previous values on the current one may vary during the evolution of the observed process. Thus, we discuss models which take into consideration this fact. We have investigated models which incorporate the structural break point, as well as the models which introduce the additional variable into the autoregressive component which decreases or increases the influence of the survival process. The models are tested and compared with some similar models on real data sets.

Fractional Multistep Differential Transformation Method used to analyze a modified form of fractional order Lorenz system

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Dynamics of nonlinear fractional-order Lorenz system is investigated by employing Fractional Multistep Differential Transformation Method (FMDTM). In order to illustrate the new technique, the numerical algorithm is applied in the 3D solution of modified Lorenz system by adding the fourth varied parameter d, considered as a highly simplified model for the weather. Parameter fixed dynamical analysis method and chaos diagram are used. Results show that the fractional order Lorenz system has rich dynamical behavior and it is a potential model for application. Investigation of dynamics is realized by fixing the parameters $a = 40$, $b = 3$, $c = 10$ (system has chaotic behavior) and by changing the added parameter $d \in [5, 38]$, implemented with the aid of Mathematica symbolic package. For $d = 25$, the minimal fractional order, for which the system shows chaotic behavior is $v = 0.8726$, for $d = 0.998$, the minimal value of d, for which system shows chaotic behavior is $d > 12.05219$. The fractional derivatives are described in the Caputo sense. Based on FMDTM, is shown that the system has rich dynamical characteristics, it changes from a non-chaotic system to a chaotic one, using fractional order $v \in (0, 1)$. The method deals with the approximated solutions to integer-order differential equations and is based on polynomial approximations, with good results (based on numerical experiments) for fractional order closed to 1.

Chain Connectedness – a Homotopy and Shape Invariant

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The characterization of connectedness by coverings led to some new concepts, as chain connected sets relative to the space, and characterizations of other notions, as the quasi-components. We review some important results on chain connectedness of spaces and sets and on components of chain connectedness. New results are also provided.

New generalizations of 1MP and MP1 inverses

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Solving some systems of equations, two new classes of generalized inverses are introduced. In this way, the concepts of 1MP and MP1 inverses are generalized. Various representations and characterizations of these new inverses are presented. Applying new inverses, a few linear equations are solved.

The paper is a joint work with Dijana Mosić.

Visualization of elementary functions and their properties

MIRA TASHKOVA*, ZORAN TRIFUNOV† *SVMS Kole Nedelkovski Veles
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With the recent changes in education in Macedonia, the number of mathematics classes is reduced or remains very small, both in high schools and in secondary vocational technical schools. But in order for students to be future successful engineers, they need to have a good knowledge of mathematics. So, in these conditions we have to find a way to achieve the same thing. The application of software and their use in studying mathematics is one of the ways to achieve the desired better results. The dynamic software will allow the students to successfully master the planned contents of mathematics, while maintaining the interest of the students, during which they will apply their knowledge from professional subjects. In this paper we will present how with the help of the free software GeoGebra we will visually represent the functions and with dynamic applets we will determine: definition area, set of values, zeros, monotonicity, etc. We will also present some elementary functions with applets that will also have sliders which will dynamically change the functions and determine their properties. All these applets are available on the web and the students themselves will be able to use them when acquiring new knowledge in mathematics.

Constructivist strategies in teaching mathematics to children

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Constructivism emphasizes the process, not the outcome of education. It is emphasized that the child's extracurricular knowledge must be used in the teaching process. The key thesis is the inability to convey mathematical knowledge through even the best demonstrations and verbal explanations. A child may know what is being shown to him, he may know all the words used by an adult, but if he does not have the appropriate previous experience and his mental development has not yet reached the necessary level, no explanation will be enough to understand and assimilate new concepts for him. Mathematical knowledge is also not created by association, by associating what the student sees with words or symbols, although such a belief was widespread in the nineteenth century and still manifests itself many times today. Mathematical knowledge is created in the child's mind as a result of a long-term process in which the basic role is played by activities performed independently (such as, for example, counting objects, arranging tokens to represent people or things referred to in the arithmetic task, playing in buying and selling, matching cut geometric figures to each other). Every child has to go through this journey personally. It is not enough that he looks closely at the actions of someone else.

Reception of Friedrich Froebel's concept in the mathematical education of preschool children in Poland

MAŁGORZATA WIŚNEWSKA*
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In the era of innovation and creativity, teachers are looking for ideas and teaching methods as desirable competences. Fryderyk Froebel is a 19th century German pedagogue and theoretician of preschool education. He formulated principles for education, taking into account the assumptions of modern STEAM: unity of the universe - unity of science, respect for the child and his individuality, the importance of play in the child's development. For this to be possible, the forces of the head, hands and heart must be integrated. Education should therefore be global. In the preschool and early school years, the child should gain as much experience as possible. What is important is his independence in acting and gaining knowledge. He developed teaching aids called gifts. The article shows the use of Frobl's concept in modern education.

Various mathematical techniques for analyzing of image data by mathematical models

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This contribution deals with the proceeding of the image data and the mathematical approach for processing and analyses of image data. We present medical, biological, and engineering data. Mathematical modeling is a very good and strong tool for the analysis and modeling of this data. Consequently, mathematical modelling brings a good analytical, enumeration, and visualization perspective if representing different types of image data. We discuss some methods for medical image analyses. One point brings perspective from discrete mathematics and discrete algorithms, dealing with graph theory, discrete mathematics, statistics, aggregation functions for image data analyses. We focus on the analyses of the techniques, using image processing and segmentation of the detected objects. We also mention machine learning approach for image data processing. A machine learning-based segmentation technique is required to get good performance to deal with biological images. Through semantic segmentation, regions of interest can be identified for cell assessment. Clinicians can use segmentation results to identify abnormal cell and improve therapy planning. The creation of high-quality labelled and annotated datasets is a critical part of achieving the algorithmic goal of automated medical image segmentation. We also consider a bottom-up aggregation procedure in which regions are merged based on probabilistic considerations. Here we use the merge strategy suggested for the Segmentation by Weighted Aggregation denoted also (SWA) algorithm which employs a hierarchy construction procedure inspired by Algebraic Multigrid solutions for differential equations. The SWA algorithm begins with a weighted graph representing image pixels, and in a sequence of steps creates a hierarchy of smaller ("coarse") graphs with soft relations between nodes at subsequent levels. The framework of the aggregation-based segmentation utilizes adaptive parametric distributions whose parameters are estimated locally using image information. Segmentation relies on an integration of intensity and texture cues, with priors determined by the geometry of

the regions. The method is modular and can readily be extended to handle additional cues. In this work we have a cooperation with Medical Faculty of Comenius University in Bratislava, Slovakia. We cooperate with the Institute of Immunology, the Institute of Anatomy, the Institute of Medical Physics, Biophysics, Informatics and Telemedicine. Image data comes from Comenius University, from Medical Faculty.

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Обука, работилници и тркалезна маса

Training seminar, Workshops and Round table

TRAINING SEMINAR WITH WORKSHOP: Strategies for encouraging creativity in teaching mathematics

TRAINING SEMINAR INSTRUCTOR:
VALENTINA GOGOVSKA*
*Ss. Cyril and Methodius University, Faculty of Natural Sciences and Mathematics, Skopje

Mathematics educators have a great challenge to foster the development of higher order thinking skills in students, such as formulating and solving problems, reasoning and communicating ideas and solutions. The purpose of this training is to involve teachers in encouraging creativity in students (for both primary and secondary school students), through regular mathematics instruction by using suitable strategies for developing creative thinking skills, in particular, mathematical problems and other instructional materials. We expect a fruitful discussion about creativity in the teaching process. Some current, open issues related to it will be encouraged.

Duration: 2 days.

On some possible forms of creativity development in teaching mathematics

WORKSHOP INSTRUCTOR:
VOJISLAV ANDRIĆ†
†Mathematical club "Diofant", Valjevo

Creativity researchers prove that creativity is a gift and that cannot be taught. But they also believe that creative behavior can be developed and encouraged. In teaching mathematics, there are several ways to encourage the student to be creative.

The aim of this methodical workshop is to demonstrate some of the possible forms of developing students' creativity in mathematics lessons using concrete examples (problem situations). Specifically, the following forms will be discussed:
1. Solving problems by analogy;

2. Solving problems in many different ways;
3. Non-standard solving of known problems;
4. Originality in solving unknown problems;
5. Solving problems using logical – combinatorial abilities;
6. Formulation of original problems;
7. Inverse problem solving;
8. Refutation of incorrect hypotheses;
9. Developing sensitivity to generalizations;
10. Observing invariance;
11. Developing the ability to quickly determine the existence of a solution to a problem;
12. Construction of a mathematical object that satisfies the given complex conditions;
13. Direct, but non-obvious application of mathematical theorems, rules, assertions;
14. Indirect and non-standard application of mathematical theorems, rules, assertions;
15. Developing the ability to solve an unknown problem by breaking it down into several known problems;
16. Independent discovery of unknown, but known to mathematical science, mathematical statements, rules, theorems;
17. Application of mathematical knowledge in non-standard life situations;
18. Solving geometric problems with algebraic methods;
19. Solving algebraic problems geometrically;
20. Other, interesting forms of developing creativity.

Workshop participants will have the opportunity to present their own experiences from teaching practice, which represent a successful example of developing creativity in mathematics teaching.

Duration: 2 Hours.

WORKSHOP: Introduction to Data Analysis and Modeling

WORKSHOP ORGANIZERS:
FILIP NIKOLOVSKI*, IRENA STOJKOVSKA†
*,† Ss. Cyril and Methodius University, Skopje
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Target audience:

- Primary: university-level mathematics lecturers, university students;
- Secondary: high school and elementary school mathematics teachers, high school students, enthusiasts.

Content. The following broad topics are covered:

- Basics of Python programming (data types and structures, conditionals, loops; libraries and modules; user-defined functions);
- Data description and visualization;
- Models and modeling (unsupervised and supervised learning).

Objectives. The following list contains the main objectives:

- Familiarization with the fundamentals of the Python programming language;
- Presenting data using appropriate tools and means;
- Choose an appropriate model in a practical setting.

Skills. After finishing the workshop, participants will be able to:

- Write short Python programs to solve a problem;
- Load, analyze and visualize data in Python using dedicated libraries and modules;
- Given some data, construct a model which can be used in applications;
- Compare several models based on their performance and choose the optimal one.

Requirements:

- General: active Gmail account for the participants (or Anaconda installed on their computers).
- Software: Browser (e.g. Google Chrome or Mozilla Firefox) and MS Excel or similar (optional).

Summary:

Data analysis and data engineering, along with machine learning are becoming an integral part of the life of researchers and scientists. Originally restricted to the applied sciences, nowadays it is increasingly becoming an integral part of everyday life. This makes understanding data and working with it very important and very relevant. The goal of this workshop is to present the capabilities of the programming language Python in terms of data analysis (loading, displaying, visualizing, and manipulating data) and model construction and evaluation (building, evaluating, and choosing an appropriate model). No previous knowledge of programming is required.

WORKSHOP: Testing Tests

WORKSHOP ORGANIZERS:
SONJA GEGOVSKA-ZAJKOVA*, OLIVER ZAJKOV†
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Teachers often use tests to assess students' knowledge. Unfortunately, during their education, they are not trained to analyze the test, to perform item analysis and to evaluate test validity and reliability. The participants of this workshop will get acquainted with test analysis instruments, they will learn the meaning of the item analysis basic indicators and how to calculate: the index of difficulty, the index of discrimination, the coefficient of biserial correlation of the points, etc. As a measure of the test reliability, Kuder Richardson's index 20 will be used. The participants will have the opportunity to analyze the real test results and learn how to interpret them, and then, based on the obtained results, they will evaluate the validity and reliability of the test. Special attention will be paid to the distractor analysis. Based on that analysis, participants will be able to create the distractors. Participants are advised to bring their own computer so they can do the analysis themselves. Basic knowledge of Excel is required.

ROUND TABLE:
Scientific and professional networks involving mathematicians

MODERATOR:
ELENA HADZIEVA*

* University of Information Science and Technology "St. Paul the Apostle", Ohrid

Target audience: Teaching and research staff from HEIs, but all others are welcome.

Description: This round-table aims to present different scientific and professional networks involving mathematicians and share personal experiences and possibilities among participants. Some of the networks that will be presented are:
1. European Women in Mathematics (EWM) – an international association of women working in the field of mathematics in Europe,
2. Central European Exchange Program for University Students (CEEPUS) – a multilateral University exchange program for students and teachers, in the extended Danube region based on an international Agreement,
3. Erasmus+ Program for Teaching Staff Exchange – supports teaching periods at higher education institutions (HEIs) abroad,
4. European Cooperation in Science and Technology (COST) – a funding organization for the creation of research networks, and
5. National Unions of Mathematicians – each country has a national union of Mathematicians that works towards popularization of mathematics and advancement of mathematics research and education; can we cooperate and/or exchange good practices?

We would like to acquaint the participants that haven't had an opportunity to be involved in some of the networks, with the ways to become a member, as an individual or institution. We would also like to present the possibilities that the listed networks offer and motivate connections between participants for establishing new cooperations within or outside the networks. The participants are encouraged to present a network that is not in the list, share their personal experience (positive or negative) of being a part of a network, and open a new discussion related to the topic. Duration of the round table: 45-60 min.

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