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ON ADVANCES IN SCIENCE
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IN SCIENCE AND TECHNOLOGY

BOOK OF ABSTRACTS

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PLENARY LECTURES

CROSSING THE CHASM WITH AYZEN THEORY OF PLANNED BEHAVIOUR

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ABSTRACT:

Ayzen's theory of planned behaviour has a fairly good effect in explaining the integration of transcription practice approaches based on therapeutic guides into clinical practice and the factors that influence such behaviour. Successful launch and dissemination of new drugs is essential to enable the application of new technologies in evidence-based medicine. Transcription practice is guided by decisions regarding specific methods for assessing treatment, optimal extraction of new treatment potential, strategy to be used to highlight new treatment

Human behaviour, according to Ayzen's theory, is guided by three types of considerations: beliefs about the probable consequences of behaviour (behavioural beliefs), beliefs about normative expectations of others (normative beliefs) and beliefs about the presence of factors that may facilitate or hinder behaviour (control beliefs) . Behavioural beliefs produce a favourable or unfavourable attitude toward behaviour; normative beliefs result in perceived social pressure or subjective norm; and control beliefs lead to perceived behavioural control or self-efficacy.

Local analgesics are effective and alternative means of systemic therapy, often minimizing the side effects of drugs and complications of systemic analgesic use. Despite the number of available local analgesics, as well as the affirmative stance in therapeutic guides for their wider use, they have been shown not to be accepted in their prescribing patterns in clinical practice. Based on the literature search results, it is clear that more educational programs on pain management are needed; however, also the affirmation of current therapeutic guides for appropriate prescribing.

Keywords: *Ayzen's theory, topical analgesics, crossing the chasm, behavioural beliefs, normative beliefs, control beliefs*

CHARACTERIZATIONS OF SOME CLASSES OF FUNCTIONS RELATED TO KARAMATA THEORY

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ABSTRACT:

In this paper we prove some characterizations of several classes of functions related to Karamata theory in terms of the corresponding index functions. Those are regularly varying functions in the sense of Karamata (RV) and extended regularly varying functions in the sense of Matuszewska (ERV).

Keywords: *Karamata theory, Matuszewska, index functions*

SPATIAL CODES IN MONTENEGRIN LITERATURE AND CULTURE

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ABSTRACT:

This paper analyzes functions of spatial codes in Montenegrin literature and examines semiotics of Montenegrin chronotop, artistically shaped in literary texts. Spatial semiosis is a manner in which space talks and it represents rather complex and subtle semiotic process in culture, providing establishment of dense net of prohibitions and restrictions of spatial type. Spatial redundancy in established and generally accepted patterns regulates behavior of people in certain area, which use is deeply rooted in culture and stored within spatial mnemonics. Thereby one of the main regulatory mechanisms of spatial structure prescribes different distance for the users of the space, that is participants in communication, which necessarily involves elements of spatial language as well. Therefore, non-verbal system of signs, such are kinesic and proxemic communication function as special regulators, conditioning our behavior and actively participating in spatial semiosis.

As geography is rather easy to turn into symbolism, every national culture transforms toponymic reality into symbolic signs, that take part in creation of national myths and sanctums. Hence, each culture in representative texts sets up system of sanctums, further building-up and compounding by illustrative type of citation, which implies perception of Tradition as treasury of truths, knowledge and experiences, full of exemplary models worthy of imitation, due to which sacral chronotops are enthroned in culture as guardians of the past, ethical code and national sanctums. However, in presentative texts, originating on the basis of illuminative type of citation, special structures with emphasized classification, representative and mythologizing semantics are disintegrating predominantly due to their primary function of carriers and guardians of culture, because havoc of their sanctity havocs cultural canon as well.

Within Montenegrin literary canon, pursuant to intertextual mechanisms, in language of space certain reserve of schematized meanings is set up, resulting in formation of spatial redundancy, register of established spatial structures to which certain value attitudes are connected to as well, in which collaboration a stable axiological system is organized. Thereby spatial axiological units of damnation and sublimity are imposed as dominant features of Montenegrin chronotops and therefore they are functioning as certain redundant force within the Montenegrin semiosphere. Two key spatial models: sublime and condemned space have their foundation in transtextuality, that is in dialogue with real geographical space, built mainly on mountain heights in which existence is aggravated, almost doomed. Spatial redundancy of condemnation will be used as a foundation for deconstructing, demonic models and axiological systems,

reaching its aesthetic climax in Lelejska gora, whilst sublimity represents foundation for construction of heroic existential space in Montenegrin literature. Although spatial damnation obtains its semantic basis and strong aesthetic articulation in Gorski vijenac, only in the texts to Montenegrin writers of the 20th century it will obtain its full artistic shape, with Ratkovic's Nevidbog and Đurović's Dukljanska zemlja, through Lalić's damned spaces and Vuković's Mrtvo Duboko, to Brković's Dioclea anathema.

Spatial redundancy functions as reserve of semantic safety on which solid foundations, among other things, identity semiosis, in which significant role is played by the spatial immunity, grounded on redundant and settled meanings of spatial structures, is based. Collective minds itself and its identity by texts, therefore intertextuality occurs as mnemonic and defense mechanism, and self-awareness, memory of national heroic being and superiority of own culture is stored in Gorski vijenac as certain guardian of Montenegrin identity. Spatial axiological units of damnation and sublimity, coded in texts of Njegoš, function as representative spatial models set up by tradition and national mythology, whose systems of values are imposed as dominant in conservative cultures prone to auto-communication, such as Montenegrin.

***ENGINEERING AND TECHNOLOGY;
COMPUTER SCIENCE; MATHEMATICS,
LOGIC AND STATISTICS***

CHARACTERISTICS AND SPECIFICS OF MSW IN MONTENEGRIN MARITIME

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ABSTRACT:

The SW concept allows the trader or carrier to provide only once all the necessary data in determining the acceptability of goods in a standardized format. The data should be forwarded to the authorities involved in border control and on a single portal. It is the responsibility of the authorities to manage the SW and to ensure that other bodies or agencies involved in this process have access to all requested and required information, eliminating the need for the trader or carrier to submit the same information more than once. SW is considered a trade moderator. For UNECE and the UN Center for Trade Facilitation and Electronic Business (UN / CEFACT), trade facilitation is defined as the process of "simplifying, standardizing and harmonizing the procedures and associated flows of information required for the transport of goods from seller to buyer, as well as its collection". The previous definition implies that in the supply chain it is important not only the physical movement of goods, but also related information flows about it, including entities that monitor this process, namely: government agencies that intervene in the transit of goods, as well as other commercial entities that deal with goods. all in accordance with the trade facilitation procedures of the World Trade Organization. Trade facilitation involves a wide and diverse range of public and private actors who want to establish a transparent, consistent and predictable environment for border transactions based on standardized and direct procedures and practices. In this regard, many countries and international organizations have recognized the many benefits of e-commerce facilitation, promoting the development and implementation of trade portals that allow businesses and governments to process trade data submitted in electronic formats, usually in one place, to all stakeholders. It is important to note that the single window has evolved from the era of customs automation to trade in information exchange, from limited single windows connecting traders with a single regulation (e.g. customs, port, etc.) to national NSWs that allow all parties to submit standardized information only once to meet all regulatory requirements. The NMSW's focus is on ship-related data, not on commodity and trade data.

Keywords: single window, human centric model, port, users

ON SUMMABILITY AND INTEGRABILITY

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ABSTRACT:

*Based on the total integrability, we will first define the integral of the real function f , as an interval function, which is associated to the antiderivative F . After that, we introduce into the analysis the notion of basic summability, as comprehensive, which includes not only all known integrabilities, such as **Newton's** and generalized **Riemann** and generalized **Riemann-Stieltjes** integrability, but also arithmetic series. In addition, the notion of the residue function is defined for the class of real functions. The sum of the values of the residue function of the interval function ΔF , which is associated with the antiderivative F , on the subset E of the compact interval I , on which the derivative f is not differentiable, gives us an estimate of the integral error, that we make by integrating the extended function f_{ex} from the set $I \setminus E$ to the set I and by taking that integral value for the antiderivative of f .*

Keywords: *basic summability, total integrability*

NUMERICAL ANALYSIS OF COVID-19 VIRUS TRANSMISSION IN A VEHICLE

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ABSTRACT:

Traveling by public transport during the COVID-19 virus pandemic has become a concern. Analysis of the vehicle environment can show how to reduce the risk of virus transmission and create safer travel conditions. This paper presents an analysis of air flow and the path of movement of virus particles inside a vehicle. A taxi vehicle and three different passenger seating positions were used for the analysis. The boundary conditions of the vehicle cabin environment were determined and three-dimensional numerical simulations were performed using computer fluid-dynamic modeling (CFD) in the Ansys software package. Numerical simulation results showed an airflow pattern that travels across the cabin during usually driving. Using the analysis of a discrete model, the path of contaminated particles infected passenger was determined.

Keywords: COVID-19, CFD, vehicle, driver, passengers

FUSED DEPOSITION MODELING IN 3D PRINTING

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ABSTRACT:

*The term 3D printing in the original sense refers to the processes that sequentially place material on a stand with powder and nozzles. In recent times, the meaning of the term has expanded to include a wider range of techniques, such as processes based on extrusion and sintering. In a broader technical sense, the term "additive manufacturing" is used for 3D printing. **Fused deposition modeling, or FDM 3D Printing**, is a method of additive manufacturing where layers of materials are fused together in a pattern to create an object. The material is usually melted just past its glass transition temperature, and then extruded in a pattern next to or on top of previous extrusions, creating an object layer by layer. This paper presents a review of fused deposition modeling technology in 3D printing.*

Keywords: 3D printing, Fused Deposition Modeling, Additive manufacturing, Tehnology

FEATURES OF ASSESSING THE COMPETITIVENESS OF CARBIDE METAL-CUTTING TOOLS

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ABSTRACT:

In modern conditions, the market of carbide metal-cutting tools is characterized by dynamic development due to the development of consumer industries of the tool, as well as increased competition based on the improvement of manufacturing technologies. In this regard, one of the urgent tasks for enterprises producing the tool is the formation of a mechanism for evaluating and improving the competitiveness of products. The article presents a scientifically based and practice-oriented methodology for assessing the competitiveness of products, taking into account the technical and economic parameters of a carbide metal-cutting tool, as well as the conditions of its implementation and operation. The authors proposed and justified the most significant indicators necessary for the study, and derived the final indicator of the competitiveness of products. The results obtained during the evaluation contribute to the development of management decisions regarding the level of product quality, pricing strategy, brand positioning and communication policy.

Keywords: *product competitiveness, competitiveness assessment, methodology, carbide metal cutting tool*

MODERN HOUSE IN A TRADITIONAL CONTEXT: PERSONAL MANSION OF THE ARCHITECT TOMISLAV MILOVANOVIĆ

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ABSTRACT:

During the period after the WW2, the mass construction of buildings destroyed in the war and construction of the new ones in almost all cities of the Yugoslav countries began in Yugoslavia. The construction of the buildings was carried out in the style of the Modern Movement, different from the one between the two wars, more precisely modernism with completely new program bases of renewal and building a new state, confirmed at the First Conference in Dubrovnik in 1950.

In that period, the construction of buildings of social standard as well as the residential buildings whether single-family or collective type of housing was represented in cities throughout Yugoslavia. This paper considers the category of single - family housing in the area of Novi Pazar, as a specific context. The specificity is reflected in the context of traditional oriental architecture.

This paper aims to investigate the impact of modernist activities on residential architecture during the 1960s in the territory of Novi Pazar. The personal family house of the architect Tomislav Milovanović, who is considered to be the builder of the Modern buildings in Novi Pazar, was taken as an example of a modern building to carry out the analysis.

Given the oriental context and local building traditions, the research problem of this paper is the examination of authenticity, ie. originality of the solution of a modern house in Novi Pazar. The basic hypothesis of this paper is that although built in an oriental context and with local building rules, the house is a typical example of a modern house. The case study of this building, its analysis and critical interpretation leads to the conclusion that the building is a specific example of a modern house with elements of vernacular.

Keywords: *modernism, modern house, vernacular, local historicism, Novi Pazar*

ENERGY ASPECTS OF THE FAMILY HOUSE OF ARCHITECT TOMISLAV MILOVANOVIĆ

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ABSTRACT:

This paper aims to point on the energy aspects of the one residential building in Novi Pazar. The house that was used in the paper is the residential house of the architect Tomislav Milovanović, which was demolished in 2021 due to the construction of a multi-storey residential building on its location. This work arises from the need of the author to leave a document about this architectural building even after the removal of the building and to point out the aspects of bioclimatic and energy efficient design that this house possessed. Based on the project documentation, photographs of the building and conversations with the architect and the owner of the house, the overall influence of various factors to build such a building was considered. The paper presents a comparative analysis of the buildings of architects Miss van der Rohe and Frank Lloyd Wright, who had an influence on the architect T. Milovanović for the design of his detached house.

Keywords: *Energy rehabilitation, sustainable development, double skin facade, transmission losses*

APPLICATION OF BUSINESS INTELLIGENCE SOLUTIONS IN TELECOM-OPERATORS' BUSINESS

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ABSTRACT:

Modern business is inconceivable without the application of the Business intelligence (BI) concept. In the conditions of stagnant revenues, increased costs, increasingly demanding users, saturated and very competitive market environment, in order to maintain their sustainable business, telecom operators are increasingly recognizing the necessity and inevitability of the application of BI. This paper analyzes the concept of Business intelligence, as well as the possibilities and effects of applying different BI methodologies (Big data analytics, Machine learning, Data mining) in the business of telecom operators. The benefits and advantages provided by the application of BI methods, techniques and tools in some of the most important telecom business domains are pointed out: (1) Customer Relationship Management (CRM), (2) Fraud Detection and (3) Network Management. Given the universality of the use of BI, the described concept and solutions can be helpful and interesting in other areas, in which companies through their activities "produce" large amounts of data.

Keywords: *Business intelligence, telecom, Big data, Machine learning, Data mining*

PRACTICAL APPLICATION OF OUT-OF-KILTER ALGORITHM

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ABSTRACT:

The algorithm under this name, together with the variants, is a method that solves the problems of optimal flow and costs. Examples of such problems are planning and procurement, scheduling by contractors, distribution and supply systems, transport on the road or rail network, electricity transmission, computer and telecommunications networks, pipe transmission systems (water, oil, ...) and the like.

The main goal of any business organization is to increase profits and satisfy its customers. Because business is an integral part of our environment, their goals will be limited by certain environmental factors and economic conditions. The out-of-kilter algorithm is used to solve a complex allocation problem involving interactive and conflicting personal choices subject to interactive resource constraints. The paper presents an example of successful use of this algorithm and proposes an extension to the areas of corporate and social planning. Customer demand, warehousing and factory capacity were used as input for the model. First, we propose a linear programming approach to determine the optimal distribution pattern to reduce overall distribution costs. The proposed model of linear programming is solved by the standard simplex algorithm and the Excel-solver program. It is noticed that the proposed model of linear programming is suitable for finding the optimal distribution pattern and total minimum costs.

Keywords: *out-of-kilter algorithm, linear programming, minimization, minimum cost flow, simplex algorithm*

BENFORD'S LAW AND GOUTEREAU'S CONSTANT

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ABSTRACT:

Main motiv to calculate Goutereau constant (short: G-constant) were analyses on time scale data. Those data cannot be treated as simple group of data, like balls in urn. In meteorology, where this constant has emerged for the first time, it's very important to consider variations on time scale, like precipitations, daily temperatures and similar. The same problem can be found in some other areas. Stock exchange indexes are changed in time and it's of essential importance to detect patterns, anomalies, ... Quotient of average variability and mean absolute deviation is calculated. It's proven that this constant is $\sqrt{2}$ for normal and $4/3$ for uniform distribution. Benford's law gives expected pattern of frequencies for digits in sets of numerical data, according to their position in numbers. One interesting aspect of application of this law is in time series, because traditional techniques of analysis by this law are oriented on whole sample, without time component. Good example of such application are financial data which are made in time, like credit and debit transactions in which their sequence sometimes is of essential importance. In this paper G-constant for Benford's law is proposed.

Keywords: *Benford's law, time series, Goutereau constant*

ECONOMIC PARAMETERS OF EFFICIENCY OF COAL REFINING PLANT CONSTRUCTION BY DRY X-RAY SEPARATION METHOD

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ABSTRACT:

The aim of this paper, and the main task of the Study, is to give an objective assessment of the cost-effectiveness of investing in the construction of a coal refining plant using the method of dry X-ray sensor separation at the open pit Gacko-Centralno polje. The need for the construction of this plant arose due to the need to provide sufficient quantities of coal with lower thermal power (LTP) that meets the minimum requirements of the Gacko Thermal Power Plant. The applied methodology of economic evaluation for the construction of a coal purification plant implies economic analysis considering the time factor. This means that the costs and benefits that will be realized over the lifespan of the Study, in accordance with the concept of time value of money, are recalculated by the discounting procedure (present value estimates). The lifetime of the Study is related to the operation of the coal purification plant with a capacity determined by the expected needs of the Mine and TPP Gacko. The task of preparing the Study was performed professionally in accordance with the rules of the profession and the applicable regulations in the field of preparation of studies, construction of facilities and environmental protection.

Keywords: *investment, cost-effectiveness, coal refining plant*

COMMISSIONING OF ABB COLLABORATIVE ROBOT

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ABSTRACT:

The aim of this paper is to show the basic steps that are necessary to put new laboratory gear into operation. The laboratory setting is described. ABB RobotStudio was used to create a virtual laboratory by adding an ABB IRB 14000 robot to the work area, a virtual controller, and a simple program for manipulating the workpiece from one side to another with a change of arms. Simulation of the program was done. The commissioning of a robot on a real platform in the laboratory has been done.

Keywords: ABB, IRB 14000, collaborative robotics, RobotStudio, virtual laboratory, commissioning

CHARACTERIZATION OF BIO-MAGNETITE NANOPARTICLES SYNTHESIZED USING *Allium cepa* PEEL WATER EXTRACT

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ABSTRACT:

Magnetic nanoparticles are valuable materials, which due to their specific characteristics have found application in various environmental processes. The synthesis of magnetite is most often performed by co-precipitation method from Fe(II) and Fe(III) salts in the alkali conditions. When the synthesis of magnetite takes place in the presence of plant extracts, bio-linked magnetite is obtained as a product, whereby its functionalization occurs and its characteristics could be significantly improved compared to the chemically synthesized magnetite. Depending on the amount and quality of plant extract, the size of the magnetite particles and its specific surface area can be varied. Plant extracts are rich in bioactive components (such as polyphenols, flavonoids, etc.), which can be attached on the surface of magnetite. In this paper, the impact of different volumes of Allium cepa peel water extracts of the same concentration (5-15 ml) on the size of bio-magnetite crystallites was investigated. The characteristics of bio-synthesized magnetite were compared with chemogenic magnetite synthesized at same reaction conditions without plant extract. Using X-ray diffraction (XRD) technique, it was confirmed that the products are magnetite, whose crystallite sizes were in the range 8-12 nm depending on the amount of plant extract used. The smallest particles of magnetite were synthesized using 7.5 ml of plant extract. The crystallite size of chemogenic magnetite was 11 nm. According to the Fourier transform infrared spectroscopy (FTIR) analysis, it can be noticed that biosynthesis has improved the functionalization of magnetite nanoparticles compared to chemogenic magnetite.

Keywords: bio-magnetite, optimization, *Allium cepa*, water extracts, characterization

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BIG DATA ANALYTICS FOR HPC ENVIRONMENT

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ABSTRACT:

Today, data from various domains can be easily found online, which can sometimes help in analyzing given problems. Statistics is a separate branch of mathematics, but here we show it in a different light that will give practical application on data in specific domains. Problems that are often the main questions these days: „Why is December the month of the highest income?“ or „Does the number of deaths due to the COVID-19 depends on the number of vaccinated?“ are initially too difficult to answer concisely, based on the multitude of chaotic data. Therefore, the purpose and idea of statistical analysis is to produce information out of chaos. But, when it comes to Big data statistics on ordinary computers sometimes the analysis is time consuming. Because of that, in this paper we give an overview of the basic statistical methods for the HPC environment by which it can discover the main features of customers, products, etc. For presenting the power of statistics we will answer the above questions using the R software.

Keywords: *HPC, Big data, R, data analysis, parallelization*

DEVELOPMENT OF INTERNET OF THINGS SYSTEM FOR IMPROVING MILK PRODUCTION

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ABSTRACT:

Sustainable agriculture and food value chain is one of the main pillars of Montenegrin „S3 Smart Specialization Strategy“ recognizing huge opportunities of application of domestic research potential towards the creation of innovative solutions for generating new products and new values in the food industry. Following this direction, through implementation of SmartMilk project, we have created an Internet of Things (IoT) based solution for real-time milk quality and quantity parameters monitoring. This paper presents main development steps of the final commercial product including planning, conceptual design, experiments, prototype implementation, testing and patent protecting phases. The essential part of the developed solution is the SmartMilk can that creates an ecosystem connecting all stakeholders in the milk production value chain: farmers, animal food producers, purchasers, dairies, consumers and government institutions.

Keywords: *smart agriculture, Internet of Things, milk parameters monitoring, sensor network, data processing*

SYNTHESIS, CHARACTERIZATION, HSA/DNA BINDING OF NEW PALLADIUM(II) COMPLEX WITH 2-AMINOTHIAZOLE- 5-CARBONITRILE

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ABSTRACT:

The palladium(II) complex with 2-aminothiazole-5-carbonitrile, as ligand was synthesized. 2-aminothiazole-5-carbonitrile was purchased commercially.

The complex was obtained by direct reaction of corresponding ligand and potassium tetrachloropalladate(II) in water/methanol solution. The complex was characterized by elemental microanalysis, infrared, ¹H and ¹³C NMR spectroscopy. From a biological point of view thiazoles and their derivatives are quite an important class of compounds due to their wide range of activities. The interactions of new palladium(II) complex with human serum albumin (HSA) and calf thymus DNA (CT-DNA) were investigated using UV-Vis absorption and fluorescence spectroscopy. The high value of the binding constant, K_b, and the Stern-Volmer quenching constant, K_{SV}, are the result of good binding of complex to HSA and CT-DNA.

Keywords: synthesis, characterization, palladium(II), thiazole, HSA/DNA interactions

VIBRATION EIGENVALUE ANALYSIS USING APPROACH BASED ON GERŠGORIN THEOREM

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ABSTRACT:

Eigenvalue problems arise in many applications in science and beyond, where it is often needed to find the placement of the eigenvalues in a complex plane. This procedure is known as the localisation of the spectra. The spectral analysis is useful for it provides information on matrices and/or operators: sensitivity to perturbations, stability, etc. The eigenvalue localization is an important tool for solving problems in matrix theory and its applications. In particular, the problem of vibration occurs in many applications in science and engineering. The calculation of the pseudospectrum of a given vibration problem and its localization, has proven to be a significant and indispensable tool in finding on the question of the asymptotic behavior of asymmetric matrices in small perturbations, especially matrices that are far from normal. It has been shown that the approach based on Geršgorin's theorem is very simple and efficient in terms of calculated costs. Thus, this paper presents a spectral and pseudospectral analysis of a vibration eigenvalue problem, that uses famous Geršgorin theorem.

Keywords: vibration, eigenvalue localisation, spectral analysis

RELIABILITY OF THE SHIP'S MAIN ENGINE SYSTEM

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ABSTRACT:

A ship can be defined as a very sophisticated technical system made up of a multiple subsystems. Over time, depending on the operating conditions, these systems are prone to different types of failures. This paper presents some of the frequent failures of the ship's main engine subsystems as the most important element of the ship's machinery system. Due to the safety of navigation, it is necessary to ensure adequate reliability of the main ship's engine, as well as all other elements of the ship's machinery system. Greater reliability is achieved by combining an additional engine with an appropriate maintenance solution. Thanks to the development of information technologies within marine technical systems, there is a continuous monitoring of all parameters relevant to the operation of the main ship's engine that allows timely assessment in determining engine failures.

Keywords: *reliability, main engine, ship, failures*

HOMOGRAPHY BASED DISTANCE ESTIMATION IN ATO SYSTEM

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ABSTRACT:

In future decades, modern railway must offer cost-effective, flexible and attractive service for people and industry. However, it requires implementing many novel and modern technical solutions as Autonomous Train Operation (ATO), that lead to automation of railway transport. One of the most important parts of the ATO is a system for obstacle detection (ODS) that can detect obstacles on rail tracks and in their close vicinity in different light conditions. Furthermore, a key element of ODS is a system for estimation of distances between detected obstacles and train.

In this paper, use of homography method for distance estimation in ATO system, was proposed. First, obstacles were detected on rail tracks and in their close vicinity using advanced image processing algorithm. Distance estimation was performed between camera and detected obstacles using of set of captured images, through mapping of points from real environment plane to the image plane. Results showed that proposed method can be used in ATO, but with certain limitations.

Keywords: railway, automation, detection, obstacle, distance

SIMULATION OF THE TECHNOLOGICAL PROCESS OF HOT FORGING THE HANDLE HOUSING

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ABSTRACT:

The technological process of forging produces parts of simple as well as complex geometries which are expected to have high quality and reliability in work, as well as the possibility of using parts with near net shape. The quality of the produced parts largely depends on the tools as well as the temperature ranges in which the forging process is carried out. The application of software tools in modern industry is becoming an irreplaceable and very efficient way of designing the technological process of hot forging. Modern software based on numerical methods are powerful tools, which allow us to perform simulations of the hot forging process and to monitor the technological process of production in all its phases without the need to make physical prototypes. In this paper, the procedure of application of FEM software tools in the analysis of the process of making the clutch lever housing will be presented..

Keywords: *Forging technology; Hot forging; FEM; Qform*

COMPARISON OF PROBABILITIES OF UNDETECTED ERRORS OVER BINARY SYMMETRIC CHANNEL FOR DIFFERENT CRC CODES AND ERROR-DETECTING CODE BASED ON QUASIGROUPS

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ABSTRACT:

The usage of error-detecting codes in every communication has a huge impact on its flow. Different error-detecting codes have been developed over the years but in this paper we put our focus on cyclic redundancy check (CRC) codes and an error-detecting code based on quasigroups. Namely, CRC are most commonly used error-detecting codes. On the other hand, last years a few error-detecting codes based on quasigroups were proposed and developed. The formulas for the probabilities of undetected errors were derived and these quasigroup codes were thoroughly examined elsewhere and was shown that they have some good properties. Therefore, the main purpose of the paper is to compare the probabilities of undetected errors over a binary symmetric channel of a few CRC codes with one error-detecting code based on quasigroups. In this paper we simulate a few CRC codes and we compare their probabilities of undetected errors with the probability of undetected errors of the code based on quasigroups. Since the code based on quasigroups has rate 1/2 in order to compare it with CRC codes, the simulations for CRC codes are done in the cases when the code rate is equal to 1/2. The simulations are done for values of the probability of bit-error in the binary symmetric channel from 0.05 to 0.5 with step 0.05.

Keywords: *cyclic redundancy check codes, error detecting code, quasigroups, probability of undetected errors, binary symmetric channel*

ERROR CORRECTION OVER BINARY SYMMETRIC CHANNEL

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ABSTRACT:

The main goal of this paper is to show the usage of error-correcting codes over a binary symmetric channel as a first step in auditing and testing the strength of the algorithms utilized. Some of these algorithms maintain the confidentiality and security of a range of information sent from source to destination over a noisy channel. As a result, knowing how the algorithms keep the processes running is critical for moving on with the research. In the experimental section of this paper, we consider an application of some error-correcting codes in the transmission of messages through a noisy binary symmetric channel. The study focuses on attempting several error-correcting codes with a specific error rate in order to collect statistics regarding the efficacy of the algorithms. We present experimental results for the well-known cyclic, convolutional, BCH codes and compare their efficiency with the cryptcodes called RCBQ (Random Codes Based on Quasigroups). Finally, we analyze how the decoding algorithm affects the complexity of data revelation and which of these codes is the best choice for a given noisy channel.

Keywords: *binary symmetric channel, cryptcodes, cyclic code, convolutional code, bch code*

DIGGING AND LOADING WITH DISCONTINUED EQUIPMENT

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ABSTRACT:

The process of digging and loading with mining equipment is most often associated with direct loading of rock mass into the vehicle or even direct transfer of excavated mass to the landfill, which depends on the operating parameters of used mining equipment. This paper will analyze the operation of discounted equipment that is most often used in surface exploitation on steep and inclined deposits (coal, stone deposits, metal and non-metallic deposits as well as on deposits of complex and irregular structure). Machines used for loading and transport in surface mines consist of many parts, the working part of which is a part of the machine used for digging rock mass. and after unloading the empty working body returns to the starting position for re-digging. This process is repeated as long as there is a need to dig the rock mass.

Keywords: *discontinuous, digging, material, machinery, landfill.*

USE OF ELECTRIC ARC FURNACE SLAG AS AN ADSORBENT FOR Sr^{2+} REMOVAL FROM AQUATIC SOLUTIONS

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ABSTRACT:

Electric arc furnace slag (EAFS) is a by product of iron and steel remelting in electric arc furnace during the steel production. This slag was used as adsorbent for Sr^{2+} removal from aquatic solutions. The adsorption experiments have been carried in a batch conditions at constant solid to liquid ratio of 1.5 and initial concentrations of Sr^{2+} ions of 150 ppm at three different temperatures of 20 °C, 35 °C and 45 °C. The results have shown that adsorption process is a fast and increase of temperature enhance Sr^{2+} adsorption onto EAFS, i.e adsorption process is endothermic character. Kinetic of adsorption process fitted the pseudo second model which indicated formation chemisorption bonds between adsorbent and Sr^{2+} ions.

Keywords: Strontium, Steel slag, Adsorption, Adsorption kinetic

NATURE-INSPIRED OPTIMIZATION ALGORITHMS FOR SUPPLY CHAIN MANAGEMENT PROBLEM: A REVIEW

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ABSTRACT:

In this paper will be analyzing the modern age nature-inspered optimization algorithms which are used in solving supply chain management (SCM) problems. The main aim of this paper is to give a review of research related to implementation of optimization algorithms in all domain of SCM. Here is describe the SCM with proposed domains and subdomains. References published in the last few years related to the optimization problems in various areas of SCM are presented. Finally, an analysis of optimization algorithm which were used for SCM are discussed. The impacts of algorithm modification and hybridization as well as future research opportunities are analyzed.

Keywords: *supply chain, optimization algorithm, TSP*

TRANSIT ORIENTED DEVELOPMENT MODEL AND TEMPTATIONS

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ABSTRACT:

Transit Oriented Development - TOD is a trend of urban planning and development of settlements and cities with the aim of creating vibrant, ecological and sustainable living communities. Also, TOD is the creation of compact, pedestrian and bicycle urban communities of mixed purpose leaning on public passenger transport systems. This allows for stress-free living and mobility and complete dependence on the passenger car. Transit-oriented development represents regional planning, revitalization of the city, reconstruction of suburbs and development of settlements that are oriented towards alternative modes of transport together. TOD quickly wins the sympathy of users. The public embraces the concept across a city-oriented region that is changing as the most desirable place to live, work, rest, recreation and play. Real estate investors quickly recognized the potential of urban settlements served by high-quality public passenger transport.

TOD is also a modern solution to the serious and growing problems of climate change and global energy risks arising from the creation of dense communities that must be intensively cooled, and whose mobility relies on the use of passenger cars and irrational energy consumption. The tendency is for TOD to reduce the number of passenger car journeys by over 70%.

The paper aims to promote TOD and to point out the challenges that await the transition from urban planning to the implementation and application of developed solutions.

Keywords: *transit, development, mobility, walking*

NATURE-INSPIRED OPTIMIZATION ALGORITHMS FOR SUPPLY CHAIN MANAGEMENT PROBLEM: A REVIEW

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ABSTRACT:

In this paper will be analyzing the modern age nature-inspered optimization algorithms which are used in solving supply chain management (SCM) problems. The main aim of this paper is to give a review of research related to implementation of optimization algorithms in all domain of SCM. Here is describe the SCM with proposed domains and subdomains. References published in the last few years related to the optimization problems in various areas of SCM are presented. Finally, an analysis of optimization algorithm which were used for SCM are discussed. The impacts of algorithm modification and hybridization as well as future research opportunities are analyzed.

Keywords: *supply chain, optimization algorithm, TSP*

CHARACTERISTICS OF SERBIAN STARTUP INNOVATION ECOSYSTEM IN THE FUNCTION OF ECONOMIC DEVELOPMENT OF THE REPUBLIC OF SERBIA

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ABSTRACT:

Through the theoretical contribution, the document systematizes previous research on the state of the Serbian startup innovation ecosystem, as one of the key determinants that can be a driver of accelerated growth and development of the Serbian economy, especially in the global context. Startups as business entities are characterized by a high degree of creativity and innovation, they are one of the most important sources for generating new jobs, promoting economic growth, developing new products and increasing the competitiveness of the domestic economy. The startup innovation ecosystem of Serbia is in the initial stages of development, so improvement of business conditions through various legal regulations and facilities will encourage the improvement of the Serbian startup community and startup culture. The importance of the startup of the innovation ecosystem has been recognized by the state as one of the priorities in the coming years, with the goal of tripling the number of startups in order to stimulate exports and increase gross domestic product. The success of a small number of Serbian startups at the global level speaks in favor of a significant impact on the economy, which is reflected not only in successful business and large investments of foreign funds, but also in acquisitions of domestic companies established as startups by large foreign companies. With their innovation, startup companies contribute to the promotion of the country and the region, and investing in them contributes to the creation of human resources that with their knowledge and skills are the basis for creating a modern knowledge-based economy.

Keywords: startup, startup innovation ecosystem, characteristics of Serbian start-up innovation ecosystem, entrepreneurship, economic development

SYNTHESIS AND PROPERTIES OF POLYURETHANE COATINGS FROM RECYCLED PET

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ABSTRACT:

Polyurethanes for the coating industry are developing rapidly, have excellent performance and application profiles. In this paper, the synthesis of polyurethane coatings from polyol obtained by recycling waste polyethylene terephthalate (PET) with a change in the diisocyanate component was performed. Three types of diisocyanates were used: hexamethylene diisocyanate (HMDI), toluene diisocyanate (TDI), and isophorone diisocyanate (IPDI). The polyol obtained by recycling PET had a hydroxyl value (HV) of 124 mg KOH/g. The molar ratio of the polyol and diisocyanate components in the synthesized samples was 1:1,15. The synthesis was performed by adding dibutyltin dilaurate as a catalyst to the preheated polyol, and after homogenization, the appropriate diisocyanate was added and mixed until the polymerization reaction began. After application on the metal tiles and drying, the samples were tested by methods for testing the properties of dry coatings: impact resistance, degree of adhesion, gloss, hardness, and thickness of the dry coating. The sample with IPDI had a foamy texture and poor elasticity, while the sample with HMDI showed the highest elasticity and impact resistance. Varying the starting components for polyurethane coatings can affect the properties of the final product, while the use of polyols from recycled PET reduces the cost of their synthesis, as well as the amount of waste from plastic material.

Keywords: polyurethanes, coatings, PET

AN ADAPTATION OF THE SIMPLE WISP METHOD AND ITS TESTING BY USING PYTHON

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ABSTRACT:

This article presents a simplified adoption of the Simple Weighted Sum Product (WISP) method, Simplified WISP method. To check the similarity of the obtained results analysis was performed, using the Python programming language, where the similarity of the obtained results was checked using the cosine similarity measure. The similarity was also checked concerning the results obtained using some prominent MCDM methods. The achieved results confirm the significant similarity of the results obtained using the Simplified WISP method and the Simple WISP method, as well as selected MCDM methods: WASPAS, ARAS, SAW, and TOPSIS.

Keywords: *Simple WISP, Simplified WISP, MCDM, cosine similarity measure*

A STUDY ON THE EFFECTS OF CONSTRUCTIVE PARAMETERS ON THE PERFORMANCE OF PHOTOVOLTAIC POWER PLANT

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ABSTRACT:

As a result of industrialisation and population growth, the need for energy is rapidly increasing. The harmful environmental impact of large-scale use of fossil fuels is becoming more obvious and renewable energy sources are becoming increasingly important in global energy production. In recent years, photovoltaic conversion of solar energy has become the main branch of the solar industry, due to technological advantages over heat conversion and the rapid development of relevant technologies and their projected capabilities. The local meteorological conditions as well as the PV system design can have a significant impact on solar power generation. This paper discusses the comparison of the output power of various types of sun-tracking PV systems at different locations in Serbia. The impact of different types of PV panel materials on annual power production is also being studied. PVGIS software, free web tool that allows users to obtain information on solar radiation and PV system energy generation from any location in the world, is used to calculate power production. The results show that the two-axis PV solar system with Cadmium telluride solar cells produces the most power.

Keywords: *photovoltaic system, environmental parameters, constructive parameters, PV technology, power generation*

THE INFLUENCE OF NATURAL CYCLES ON CLIMATE CHANGE

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ABSTRACT:

The influence of natural cycles on the climate of our planet was very successfully and in detail examined by Milutin Milanković. He described mathematically precisely how the movement of the Earth around the Sun over long periods of time is reflected in its climate at different latitudes. Modern researches shows the existence of some other natural cycles - astronomical, related to the activity of the Sun and its cycles, and terrestrial, related to periodic processes on Earth such as El Niño and La Niña, which also affect the climate. This paper will discuss all these impacts as well as scientific predictions of the further course of climate change in this century.

Keywords: *climate change, cycles, Earth, Sun, solar activity*

MARKETING NEW COOKIES WITH THE AIM TO IMPROVE DIET, TOURISM AND THE MODERN LIFESTYLE

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ABSTRACT:

In the last decades urban population is characterized by sedentary lifestyles, low physical activity and fast food. These changes in diet and physical non activity have been associated with the increase of chronic non diseases. Cookies are one of the most popularly wheat products consumed worldwide. This is mainly due to their affordable cost, ready-to-eat, availability in different salty and sweet tastes and long shelf life. Changes in the formulation of cookies with the aim to improve their nutritional and functional properties usually lead to changes in the dough properties which is related reflected to the quality of the finished product. The aim of this paper is researching the impact of adding lyophilized peach to cookies on sensory characteristics and consumer acceptance of a new product as a key factor for successful marketing of a new product. This paper is promoting a new type of cookies with lyophilized peach to improve diet, tourism and modern lifestyle. As well as to lead toward the reduction of non-chronic diseases.

Keywords: cookies, lyophilized peach, sensory analysis, consumers

APPLICATION OF WASTE LASER TONER IN RUBBER COMPOUNDS

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ABSTRACT:

Despite the good practice of reducing of the usage of paper documents in order to reduce deforestation, the problem of waste laser toner still remains in all types of companies. Toner is a powder mixture containing polypropylene, fumed silica, and various minerals for triboelectrification. Originally, the particle size of toner averaged 14–16 micrometres or greater, in case of high quality printing, particle size are more reduced, reaching about 8–10 micrometers. Based on their chemical composition and particle size, they can potentially be used as fillers in rubber compounds. In this paper the influence of different types of waste toner content on the basic mechanical properties (tensile strength, elongation at break, elastic modulus, hardness, etc.) of rubber compounds is presented.

Keywords: waste toner, rubber compounds, mechanical properties, tensile strength, hardness

KNOWLEDGEWARE ADVICE PRODUCT MANUFACTURABILITY SYSTEM

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ABSTRACT:

There are numerous challenges in developing any product. From the technical side, various materials, production processes, technologies and procedures are considered. Market demands usually indicate the specifics, innovation, and unique characteristics that a product should have. Customers, as well as the company's management, expect excellent performance, high quality, and low product prices. All this requires the participation of a multidisciplinary team of experts in various fields and their cooperation in the earliest stages of product development. Powerful software tools that incorporate the expert knowledge and facts, ensure the simultaneous work of experts in various fields. This paper will present an expert system for manufacturability analysis, which with its advice indicates possible directions of product development, performs manufacturability analysis and provides support to the decision-making process. In a rule-based expert system, knowledge is represented as a set of rules, and advice is obtained from previously defined rules. The basis for this is the parametrically designed product model in which the rules are incorporated. In this way, the design process is automated and the credibility of the virtual product model is verified. The work presents real-world examples of the concept of a virtual manufacturability advisor and its importance in the decision-making process.

Keywords: *product development, manufacturability, expert system, virtual advisor*

THE POLLUTANT EMISSIONS ASSESSMENT FROM PERSONAL VEHICLES IN THE REPUBLIC OF SERBIA

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ABSTRACT:

Most of the air pollution originates from combustion processes, so it is important to make quantitative as well as qualitative analyses, as the sources of pollution can be stochastic, especially road traffic, which significantly contributes to emissions. The goal of the paper is to define closer road traffic emissions, as one of the major sources of pollution. The analysis was based on vehicle fleet composition and the estimation of annual mileage. Also, the engine data was used as the input for the combustion software which was used to simulate the combustion process in order to obtain specific emission factors. The results of simulations showed good agreement with vehicle technical inspection results, and the results of other authors. Based on these data, annual road traffic emissions of carbon dioxide, carbon monoxide, and nitrogen oxides from personal vehicles were estimated for the Republic of Serbia.

Keywords: *emission, pollution, road traffic*

DESIGNING OF MANUFACTURING CYCLE OF A COMPLEX PRODUCT USING GANTT CHART

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ABSTRACT:

The paper presents a methodology for designing the production cycle of a complex product based on the process of transforming its graph of technological structure into gantt lines. On the example of a complex product, which is in the production program of the "Sloboda" Co. – Cacak, Gantt charts were designed in the earliest and latest beginning with and without overlapping production phases. Special attention is paid to the production phases that are conditioned, that is, which form a characteristic path in the graph of the technological structure of a complex product. In these production phases, it is necessary to design a time reserve in order to reduce the impact of intermediate losses on the duration of the production cycle. This approach to designing the production cycle time will make it easier for the Company's management to plan and manage production.

Keywords: *design, production cycle, complex product, Gantt charts*

***BIOLOGY, PHYSICS, CHEMISTRY;
MEDICAL SCIENCES***

IMPROVING ETHYLENE GLYCOL-BASED HEAT TRANSFER FLUIDS BY IONIC LIQUIDS AND BIOCOMPATIBLE MOLECULES

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ABSTRACT:

In this paper, the influence of the additives - eight ionic liquids (ILs): 1-methylimidazolium chloride ($[C_0mim][Cl]$), 1,3-dimethylimidazolium chloride ($[C_1mim][Cl]$), 1-ethyl-3-methylimidazolium chloride ($[C_2mim][Cl]$), 1-butyl-3-methylimidazolium chloride ($[C_4mim][Cl]$), 1-hexyl-3-methylimidazolium chloride ($[C_6mim][Cl]$), 1-ethyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide ($[C_2mim][NTf_2]$), 1-butyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide ($[C_4mim][NTf_2]$) and 1-hexyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide ($[C_6mim][NTf_2]$), as well as caffeine on the transport properties ethylene glycol (EG) was studied. Based on the measurement of density, viscosity, electrical conductivity, and thermal analysis of EG mixtures with ionic liquid or caffeine in the temperature range (278.15 - 313.15) K, the values of apparent molar volume, standard partial molar volumes, apparent molar volume at infinite dilution, Masson's interaction coefficient, thermal expansion coefficient, limiting apparent molar expansibilities, Heppler's coefficient, thermodynamic parameters were calculated. Molecular dynamic simulations supported experimental results. The obtained results were used to evaluate the influence of ionic liquids' alkyl side-chain length and anion on the possibility of improving EG as a heat transport fluid. The influence of self-aggregation of caffeine molecules on the reduction of EG viscosity was also investigated.

Keywords: transport properties, heat transfer, ionic liquids, caffeine, ethylene glycol

INVESTIGATION OF WATER SUBSTITUTION IN Ru^{II} COMPLEXES BY CONCEPTUAL DFT CALCULATIONS APPROACH

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ABSTRACT:

Chemistry is the science of bond making and bond breaking, so the study of these processes is fundamental in understanding the chemical reaction mechanism. Besides bonding, reactivity and kinetics belong to the keystone of chemistry. The insight into a chemical reaction requires a proper understanding of all these aspects associated with the undergoing processes. In this report, we investigated water exchange reactions and water substitution in Ru^{II} complexes of general formula [Ru(terpy)(N^N)(H₂O)]²⁺ (where N^N = ethylenediamine (en), 1,2-(aminomethyl)pyridine (ampy) and 2,2'-bipyridine (bipy)) by ammonia and thioformaldehyde. These reactions were studied in detail by applying conceptual density functional theory.¹ This approach enabled us to gain further insight into the underlying reaction mechanism at the microscopic level (involving only direct participants of the reaction, without the influence of solvent) and to put the concept of the reaction mechanism on a quantitative basis. The course of the chemical reaction along the reaction coordinate ξ , is rationalized in terms of reaction energy, force, dipole moment and reaction electronic flux (REF). The results yield and characterize the significant influence of an intermolecular hydrogen bond formed between the entering and the spectator ligand to the overall energy barrier of the reactions, details that could not be observed by conventional experimental investigations of reactions kinetics and mechanisms, but should be taken into account in designing the suitable complexes for desirable reaction behavior like in catalytic processes.

Keywords: Ru^{II}-complexes, water substitution, conceptual DFT, reaction mechanism, reaction force analysis, reaction electronic flux (REF)

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PREPARATION AND CHARACTERIZATION OF ACTIVE CARBON FROM BIOWASTE USING ACID

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ABSTRACT:

The aim of this research is to convert biowaste into carbon material and later into active carbon material. With that, we got two things in one go. We have received new material that is ready for various applications in various spheres of life and on the other hand we have removed waste and thus we have prevented additional pollution and preserved the environment. In our work, we used hydrothermal carbonization to obtain active carbon material from biowaste, exactly plane tree fruit. Various acids in different ratios were used as activators. The effects of the chemical agent on the structure of the obtained material were investigated. It was noticed that the process parameter pH value of the initial solution affects the structure, morphology and properties of the obtained final product, active carbon material. The values of specific surfaces of the treated sample increase by lowering the pH value. Characterization of the obtained activated carbon material was performed by nitrogen adsorption-desorption isotherms, X-ray diffraction (XRD) and scanning electron microscopy (SEM). Functional surface groups were determined by Fourier Transform Infrared Spectroscopy (FTIR).

Keywords: *biowaste, active carbon material, acids, hydrothermal carbonization*

SEISMIC ACTIVITIES AND IONOSPHERE REACTION

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ABSTRACT:

The ionosphere is a part of the Earth's atmosphere specific for the increased concentration of charged particles. By monitoring the reaction of these charges, primarily negatively charged electrons, to various disturbances coming from space or from the Earth's surface, conclusions can be drawn about the intensity, nature and origin of these disturbances. Since Montenegro is in the seismic active area, changes in the ionosphere caused by seismic activity were examined. The carrier of disturbances between the trembling soil and the ionosphere are gravitational-acoustic waves.

Keywords: seismic activity, ionosphere, disturbances, gravitational-acoustic waves

INVESTIGATION OF TRACTION PROPERTIES OF SMALL-SIZED AGRICULTURAL MACHINERY

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ABSTRACT:

The development of peasant (farm) farms, personal subsidiary farms and garden plots requires the improvement of the material and technical base, including tractors. Minitractors are designed to replace energy-saturated agricultural tractors in small farms and farms, where the use of oversized equipment is not only difficult, but also not profitable.

In recent years, there has been a growing trend in the nomenclature of minitractors. Thus, competitive conventional and small-sized tractors have been developed and widely advertised. Tractors of foreign production have been widely distributed. Tractors must meet certain operational requirements based on scientifically sound properties and indicators. These requirements include ensuring high productivity and efficiency. The productivity of a tractor working in an aggregate with agricultural machines depends on their width of grip, on the power of the tractor engine, the traction resistance of the machines, the average speed of the machine-tractor unit and a number of other factors. In this regard, productivity is determined by the energy availability and traction properties of tractors. To solve these problems, manufacturing companies are continuously working to improve the design of serial units and assemblies, as well as develop and design new, more advanced models. When creating a new model of tractors, it is necessary to provide technical characteristics. The technical characteristics of the tractor are determined by the methods of bench and field tests. However, there are no corresponding stands for bench testing of small-scale tractors. The article presents the results of the development of stands for testing small-sized tractors and the methodology and results of traction-dynamic and fuel-economic tests of tractors in laboratory conditions at the Department "Cars, tractors and technical service" of St. Petersburg State Agrarian University._20

KEYWORDS: *small-sized tractors, tests, stand, performance, model, technical characteristics*

THE EFFECT OF GLUCOSE ON TOXICITY OF SILVER NANOPARTICLES AND IONS IN *CHLORELLA VULGARIS*

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ABSTRACT:

*Silver nanoparticles (AgNPs) belong to a group of frequently used materials in medicine and science and are well known for their antimicrobial properties in many commercially available products, but due to their toxicity and reactivity, they can pose a risk to the aquatic environment. Since *Chlorella vulgaris* is one of the most ubiquitous microalgae inhabiting aquatic ecosystems, it is widely used as a model organism for assessing the impact of materials of anthropogenic origin, e.g. AgNPs, on aquatic habitats. Glucose is a source of energy for algae and improves their growth and viability. However, it can also act as a mild reducing agent and improve the stability of AgNPs and prevent their aggregation, so it is sometimes used as a surface coating for NPs. To evaluate the impact of AgNP-PVP on *C. vulgaris*, algae cultures were grown in a liquid BBM nutrient medium with and without the addition of 1% glucose. Once the algae reached the exponential growth phase, they were treated with 1.5 mg/L of either AgNP-PVP or ionic silver (AgNO₃). To evaluate the effects of AgNP-PVP and AgNO₃, changes in the algae growth, cell viability and rate of photosynthesis were analysed after 5 and 24 hours of exposure. Furthermore, to visualize ultrastructural changes after the treatments, algae cells were examined by transmission electron microscopy. To further examine the interaction between AgNPs and algal cells, a drop of treated algal cells, previously washed with ultrapure water, was added on a copper grid, air-dried, and then observed directly by TEM.*

Keywords: silver nanoparticles, *Chlorella vulgaris*, ultrastructure, glucose

ANALYSIS OF TEST ANXIETY AMONG STUDENTS OF MEDICAL SCIENCES: A CROSS-SECTIONAL STUDY

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ABSTRACT:

Test anxiety is a pathological fear that occurs during the preparation and administration of a test. It can be manifested with both somatic and cognitive symptoms. The purpose of this cross-sectional study was to analyse test anxiety among students at the Faculty of Medicine in Novi Sad, Serbia. A total of 375 respondents completed the Test Anxiety Inventory – TAI, a widely used inventory for assessing test anxiety that is most commonly used in school and student populations. Sociodemographic and educational characteristics of the respondents were collected as well, and correlated with the levels of test anxiety. In this sample, 15.5% of participants experienced no anxiety, 42.2% mild anxiety, 36.5% moderate anxiety, while 5.8% demonstrated severe anxiety. The average overall TAI score was 48.25 points. Females, those who finance studies on their own, those who renewed a previous year of studies and those with a lower grade point average experienced the highest levels of test anxiety. There was no statistically significant difference in the intensity of test anxiety between students from different study programs (medicine, dentistry, pharmacy, and nursing science) and different years of studies at this faculty. This study discovered that a significant number of students suffer from test anxiety, which can be a factor affecting their academic performance. We identified the vulnerable population of students that should be given priority access to professional counseling.

Keywords: *test anxiety, medical students, academic performance, test anxiety inventory*

DOSIMETERS OF IONIZING RADIATION IN RADIOTHERAPY BASED ON PMOS AND FLOATING GATE MOS TRANSISTORS

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ABSTRACT:

Dosimeters that would be used in radiotherapy preferably have the ability to read the absorbed dose in real time. This allows monitoring of the dose received by the patient during ionizing radiation exposure. In addition, their great advantage is if they are small enough to fit into the cancer that is the target during radiotherapy. These two advantages (real-time dose monitoring capability and small sensor element) allow patients to receive the lowest possible dose, thus avoiding their unwanted exposure to higher doses of radiation than necessary. One way is to use crystals (e.g. optical fibers) that are sensitive to ionizing radiation and emit fast luminescence or radioluminescence (RL) under radiation. Very promising dosimeters in radiotherapy are transistors based on metal-oxide-semiconductor (MOS) structure, primarily p-channel MOS (pMOS) transistors and MOS transistors with a floating gate (FG), which meet the two above advantages. Some results of our research related to pMOS dosimeters and FG dosimeters are presented in this paper.

Acknowledgments: *This research was funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No. 857558, and by the Ministry of Education, Science and Technological Development of the Republic of Serbia under the project No. 43011.*

Keywords: *ionizing radiation, radiotherapy, radiation dosimeters, pMOS transistors, floating gate MOS transistors*

SYNTHESIS, CHARACTERIZATION NOVEL LIGAND AND THEIR CORRESPONDING COMPLEX WITH PALLADIUM(II) IONE. CRYSTAL STRUCTURE OF S,S-PROPYLENEDIAMINE- N,N'-DI-2-(3-METHYL) BUTANOATE ACID HYDRATE DIHYDROCHLORIDE

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ABSTRACT:

In this paper, we presented synthesis, characterization crystal structure of new ligand propylenediamine-N,N'-di-2-(3-methyl)butanoate acid hydrate dihydrochloride and their cooresponding palladium(II) complexes of formula [PdCl₂(S,S-pddmb)]. The compounds were characterized by elemental microanalysis, infrared, ¹H and ¹³C NMR spectroscopy. The spectroscopically predicted structure of the obtained ligand was confirmed by X-ray structural analysis. The ligand has been obtained in reaction S-Valine (2 mol) and 1,3-dibromopropane (1 mol) in base madium (NaOH). The spectroscopically predicted structure of the obtained propylenediamine-N,N'-di-2-(3-methyl)butanoate acid hydrate dihydrochloride, H₂-S,S-pddmba·H₂O·2HCl were confirmed by x-ray analyse of the crystal structure. The complexes have been obtained by direct reaction of corresponding ligand and potassium tetrachloropalladate(II). By spectroscopic analysis we confirmed that there was a bidentate coordination of palladium for nitrogen atoms.

Keywords: synthesis, palladium(II), propylenediamine

SYNTHESIS, CHARACTERIZATION, HSA/DNA BINDING OF NEW LIGAND *S,S*-PROPYLENEDIAMINE-*N,N'*-DI-(2,2'- BENZYL) ACETIC ACID AND THERE CORRESPONDING PALLADIUM(II) COMPLEX

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ABSTRACT:

*The novel compounds ligand *S,S*-propylenediamine-*N,N'*-di-(2,2'-benzyl)acetic acid of formula, $H_2S,S\text{-pddba} \cdot 2HCl \cdot 2H_2O$ and their corresponding palladium(II) complex of formula, $[PdCl_2(S,S\text{-pddba})]$ were synthesized.*

*The ligand was prepared in reaction 1,3-dibromopropane and double equimolar quantities *S*-Phenylalanine in base medium. The complex was obtained by direct reaction of corresponding ligand and potassium tetrachloropalladate(II) in water solution. The ligand and complex were characterized by elemental microanalysis, infrared, ¹H and ¹³C NMR spectroscopy. The interactions of new ligand and corresponding palladium(II) complex with human serum albumin (HSA) and calf thymus DNA (CT-DNA) were investigated using UV-Vis absorption and fluorescence spectroscopy. The high value of the binding constant, *K_b*, and the Stern-Volmer quenching constant, *KSV*, are the result of good binding of complex to HSA and CT-DNA.*

Keywords: synthesis, phenylalanine, palladium(II), propylenediamine

THE INTERACTIONS OF NEW MONONUCLEAR RUTHENIUM(III) COMPLEXES WITH DNA AND BSA

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ABSTRACT:

In order to find complex compounds of transition metal ions which would successfully replace cisplatin, ruthenium complexes occupy a very important place. These promising compounds have good solubility in water, a wide range of oxidation states (Ru(II), Ru(III) and Ru(IV)), as well as lower toxicity and resistance compared to platinum complexes. Among the numerous reported ruthenium complexes that show potential as anticancer therapeutics, Ru(II) polypyridyl complex (TLD1433) and Ru(III) complexes (NAMI-A and KP1019) have progressed to clinical trials.¹ Recently, the investigation was spread on dinuclear ruthenium complexes as well.²

*The subject of this study are three new mononuclear Ru(III) complexes of the general formula [RuLClH₂O], where L are substituted enol-Schiff bases (N,N'-bis-(acetylacetone)methyletilendiamine - **complex 1**; N,N'-bis-(phenylacetone)methyl etilendiamine - **complex 2**; and N-acetylacetone-N'-phenylacetone)methyletilendiamine - **complex 3**). Interactions of these complexes with biologically important molecules, such as DNA and bovine serum albumin (BSA), were examined. Abilities of complexes to interact with DNA were examined using the absorption spectrophotometry and viscosity measurements, while the interactions with bovine serum albumin (BSA) were studied using the fluorescence spectroscopy. These interactions were examined in order to determine ability and affinity of complexes to interact with biologically important compounds, which could indicate their potential antitumor activity.*

Keywords: Ru(III) complexes, DNA, BSA, interactions, viscosity

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PREDICTING THE IDEAL WEIGHT IN THE PROCESS OF DIALYSIS OF CHILDREN USING ARTIFICIAL NEURAL NETWORKS

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ABSTRACT:

The research presents use of artificial neural networks in predicting ideal children weight during the process of dialysis. Sampling is performed every 15 minutes. The patient's height and weight are measured to calculate the BMI (Body Mass Index). In addition to the above, bioimpedance, hematocrit and blood pressure are measured. Based on the measurement of BMI as well as other parameters, the ideal body weight is determined by the attending physician. The goal is introducing artificial neural network in order to improve accuracy of predicting ideal weight which is now subjective process. The model of artificial network is created and also the training and testing procedure are presented. The accuracy is satisfying. The future work is related to developing system which includes use of smart watches for children and automatically detection of need for medical procedure in domain of dialysis.

Keywords: *Dialysis, Artificial neural network, ideal weight*

ANTICANCER ACTIVITY OF SELECTED β -DIKETONATES

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ABSTRACT:

*Cancer is second worldwide cause of death. Considering, there is a reasonably tendency for constant development in this field of drug design. In this paper were investigated anticancer activity of four β -diketonates on two cancer cell lines (Human cervix - HeLa and breast - MDA-MB231) and human fibroblasts (MRC-5) while cisplatin was used as a positive control. IC_{50} values, i.e. 50% inhibitory concentrations, were lower for HeLa cells, suggesting better susceptibility of these cells in comparison to MDA-MB231 cells. Closely, compound **2c** showed the best anticancer potential on HeLa cell lines (after 24h $14.52 \pm 5.28\mu M$ and after 48h $10.99 \pm 0.82\mu M$). Furthermore, all compounds showed very good selectivity as their IC_{50} values were $>100\mu M$ after 24h and 48h treatment.*

Keywords: β -diketonates, anticancer activity, selectivity, HeLa, MDA-MB231

LEVELS OF RADIOACTIVITY OF NATURAL RADIONUCLIDES AND ¹³⁷Cs ON CHARACTERISTIC LANDFILLS AND NATURAL HABITATS IN SERBIA

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ABSTRACT:

Recent studies show us that contamination of environment is usually done by estimating soil and grass. Radionuclides in natural and anthropogenically degraded habitats are major human and environmental health concern. The goal of this research was to determine the levels of natural and artificial radioactivity in 8 different habitats – 4 samples of substrate of characteristic landfills in Serbia (fly ash deposits, asbestos tailings, lead-zinc-copper mine flotation tailings and sludge dumps) and 4 natural habitats with minimal anthropogenic disturbance (1 sandstone habitat and 3 different salt marshes). A gamma spectrometry was used to measure the activity concentrations. Mean values of specific activity ⁴⁰K, ²²⁶Ra, ²³²Th and ¹³⁷Cs are: 392.3 Bqkg⁻¹, 37.9 Bqkg⁻¹, 38.9 Bqkg⁻¹ and 11.3 Bqkg⁻¹ respectively. These doses are not harmful to the general public's health.

Keywords: landfill, gamma spectrometry, radioactivity concentrations

EFFECT OF USING BIOCOMPATIBLE IONIC LIQUIDS AS COSOLVENTS ON THE REACTIONS OF Rh(III) COMPLEXES WITH 5'-GMP, AND CT-DNA, AS WELL AS ON THEIR CYTOTOXIC EFFECT

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ABSTRACT:

Rh(III) complexes attract increasing attention as potential anticancer agents with a lot of prosperity. However, one of their downsides is poor solubility. Usually, highly toxic classical organic solvents such as DMF, and DMSO, are used as cosolvents to dissolve these complexes. Ionic liquids are known for their potential as "green" solvents and can be non-toxic for the human organism. In this paper, we have examined the impact of using biocompatible choline-based and agmatine-based ionic liquids as cosolvents on the reactions of a series of Rh(III) complexes containing tridentate N, N, N-donor ligands with 5'-GMP and CT-DNA, as well as on their cytotoxic effect. Examined ionic liquids do not interact with the examined ligands on their own. Reactions were followed in the presence and absence of ionic liquids, to see the impact of using different biocompatible cosolvents on the constant rates compared to the use of classic highly toxic organic cosolvent. Cytotoxic effect was also followed in the presence and absence of ionic liquids.

Keywords: *Rh(III) complexes, ionic liquids, biocompatible, DNA, cytotoxic effect*

Acknowledgements

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INVESTIGATION OF THE EFFECT OF THE FRICTION GEOMODIFIER ON PERFORMANCE INDICATORS OF TRIBO- CONJUGATIONS

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ABSTRACT:

A significant part (about 30%) of the world's energy resources in various forms is spent on friction, 80...90% of mobile machine interfaces fail due to wear and tear. At the same time, efficiency, accuracy, efficiency, reliability and durability of machines decrease, dynamic and acoustic characteristics deteriorate.

Studies in the field of mechanics of contact interactions, chemical and dissipative processes in the surface and near-surface layers of rubbing materials show that the material in these zones in the process of friction dramatically changes its physical state, changing the mechanism of contact interaction. There are significant changes in the sub- and microstructure of the surface micro-volumes. The study of the kinetics of structural, phase and diffusion transformations, strength and deformation properties of active micro-volumes of the surface, elementary acts of deformation and destruction, the search for numerical criteria for optimal structural condition, surface quality assessments should be the fundamental basis in the search for materials and lubricants of wear-resistant interfaces.

The emergence of new methods and means for determining the structure, structure and composition of surface layers arising in the friction process makes it possible to expand scientific and applied research in the field of boundary lubrication, chemical and physical properties of oil additives. Important for the restoration of machine parts is the possibility of obtaining thin surface films on friction surfaces under the influence of contact pressures, temperatures, time factor, chemical interaction of materials and lubricants, when exposed to the environment and when treating friction surfaces with special compounds. In the course of research, theoretical and experimental studies of the impact of friction geomodifiers on the rubbing interfaces of machine parts were carried out.

As a result of the study, methods were obtained for introducing tribotechnical compositions into the lubricating medium and applying them to the surface of machine parts. Recommendations have been developed for the use of friction geomodifiers in the technological processes of machine repair.

Key words: *antifriction material, geomodifiers of friction, finishing antifriction treatment, coefficient of friction, surface roughness, reduction of mechanical losses, tribo-tension, operability, wear resistance.*

INFLUENCE OF CULTIVATION TIME ON THE PRODUCTION OF *Trichoderma harzianum* BIOCONTROL AGENT

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ABSTRACT:

*A large number of pathogenic fungi lead to losses in agricultural production and problems in terms of food safety. For maize, as one of the most important crop, the significant pathogens are representatives of the species *Fusarium graminearum* and *Aspergillus flavus*, producers of mycotoxins. The alternative to chemical pesticides is based on the usage of biological control agents as an environmentally friendly ways in the control of phytopathogenic diseases. The genus *Trichoderma*, especially *T. harzianum*, have great potential in biocontrol. However, the production of biocontrol agents has many challenges because, in addition to an appropriate cultivation medium, the duration of the bioprocess significantly affects the cost of production. In this study, influence of cultivation time on the production of *T. harzianum* bioagent effective against two maize pathogens, *F. graminearum* and *A. flavus*, was investigated. The research was carried out in Erlenmayer flasks during ten days on a commercial medium and on a semi-synthetic medium in order to make a comparison. The results showed that the optimal cultivation time on both media was four days, but that larger inhibition zone diameters against *F. graminearum* (59.00 mm) and *A. flavus* (40.33 mm) were obtained by cultivating *T. harzianum* on a semi-synthetic medium. Examining influence of cultivation time on a small scale is the first step towards increasing the production scale of this high-value product, and the shortening of the cultivation time obtained in this study also contributes to reducing the costs of this production process.*

Keywords: *Trichoderma harzianum*, biotechnological production, cultivation time, biocontrol, maize disease

XANTHAN BIOSYNTHESIS ON WINERY WASTEWATERS IN LABORATORY BIOREACTOR

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ABSTRACT:

*Intensive development of the wine industry during the last few decades resulted in numerous ecological problems due to release of non-negligible amount of untreated wastewaters. Winery wastewaters are the outcome of various washing operations implemented in different stages of winemaking and commonly contain high content of organic and inorganic contaminants. Taking into account the seasonal nature of wine production, the quantity and composition of these effluents greatly vary on daily and annual basis. In order to minimize the negative impact on the environment, several strategies for winery wastewaters management based on the principles of circular economy are proposed. Among them, the production of xanthan, commercially the most important microbial polysaccharide, is one of the sustainable solutions. In this study, the performance of xanthan biosynthesis by *Xanthomonas campestris* ATCC 13951 on mixed wastewaters from white wine production in laboratory bioreactor was examined. Wastewaters generated during the washing of crusher, press and tank after grape must clarification were mixed to obtain cultivation medium with initial sugars concentration of 30 g/L. The xanthan production process was carried out in 7L stirred tank bioreactor under proposed conditions. In addition to the media characteristics and indicators of biopolymer quality, separated xanthan amount and degree of sugars conversion into product were determined in order to examine the bioprocess success. The results for biopolymer quantity (23.96 g/L) and calculated conversion (78.40%), obtained in applied experimental conditions, confirm that wastewaters from white wine production have a great potential to be used as raw material for industrial xanthan production.*

Keywords: *Biotechnological production, xanthan, *Xanthomonas campestris*, winery wastewater, laboratory bioreactor*

DESMID FLORA OF OKRUGLICA LAKE (MT. GOLIIJA, SERBIA)

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ABSTRACT:

Lake Okruglica is one of the most beautiful natural treasures of Mt. Golija, Serbia. It is located at an altitude of 1485 meters (43° 27' 15" N, 20° 16' 51" E) on a small grassy plateau, in the area of Veliki livade, in the source part of the Jastrebovačka river. There is no concrete information about its depth and springs. It has an irregular shape, with a total area of 500 square meters. This place has not been explored yet and there are no data on previous hydrobiological and algological studies of this lake. The algological samples from Okruglica Lake were collected from 3 localities during June and August 2021. The water pH varies within the range of 6.7-7.5; dissolved oxygen concentration – 2.2-5.9 mg/l; saturation 22-68%. The algological material was analyzed using Carl Zeiss AxioImager M1 microscope and digital camera AxioCam MRc5 with AxioVision 4.9 software. On the basis of relevant literature (Lenzenweger 1996, 2003; Coesel & Meesters 2007) 58 desmid taxa were identified. Among 6 genera of all desmids in all (Closterium, Cosmarium, Desmidium, Euastrum, Hyalotheca, Staurastrum) the most diverse and most common was genus Cosmarium (22 taxa or 37,93%).

Keywords: *desmids, algae, Okruglica Lake, Serbia*

CORRELATION BETWEEN METHODS OF ACTIVATION OF MONTMORILLONITE K10 AND FORMALDEHYDE CONTENT IN UREA-FORMALDEHYDE COMPOSITES

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ABSTRACT:

In this paper, the methods of activation of montmorillonite (MMT) K10 with the content of formaldehyde (FA) in urea-formaldehyde (UF) composites are compared. MMT K10 samples were activated in two ways: thermally(physical activation) and with sulfuric acid (chemical activation). In situ synthesis of UF composites with unmodified and activated K10 under the same conditions was performed. A total of three UF composites were synthesized: reference UF composite containing unmodified MMT UF/K10, UF composite containing thermally activated MMT (UF/□K10), and UF composite containing activated MMT with sulfuric acid (UF/ SKK10). Characterization of inactivated and differently activated MMTs as well as synthesized UF/MMT composites was performed using scanning electron microscopy (SEM), X-ray analysis (XRD), thermogravimetric analysis-TG, and infrared spectroscopy (FTIR), and the degree of success of MMT activation was monitored by determining the specific surface area (SP) of MMT using the Sears method. Based on the obtained values for SP, it can be concluded that successful activation of K10 was performed in both ways, because the value increased in both samples compared to unmodified K10 from 74.2 m²/g to 317.4 m²/g for □TK10 and 183 m²/g for SKK10. The content of free FA was determined by the bisulfite method. The obtained results show that there is a correlation between the way of activating MMT K10 and the FA content in the tested UF/MMT composites. The lowest FA content was determined for UF/SKK10 composites and is 0.06% compared to the UF/K10 sample containing 0.5% FA and UF/□TK10 has 0.9% free FA.

Keywords: Activation, Specific surface area, Montmorillonite, free formaldehyde, urea-formaldehyde composite

ANTHRARUFIN AS REVERSE TRANSCRIPTASE (RT) INHIBITOR AND POTENTIAL INHIBITOR OF HIV REPLICATION

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ABSTRACT:

During the 1990s, it was discovered that quinones with one, two, and three aromatic rings are a class of micromolar non-peptidic inhibitors of HIV-1 protease, an enzyme essential for replication of the HIV (Human Immunodeficiency Virus) and an important drug target for AIDS (Acquired immunodeficiency syndrome). It was later observed that simple hydroxyquinones inhibit HIV-1 protease at the micromolar level, which represented a promising goal for the development of HIV drugs. Anthrarufin (1,5-dihydroxy-9,10-anthraquinone) is an anthraquinone already recognized as a molecule with antimalaric and moderate antioxidative activity. In this paper, the molecular interactions between active binding sites of the HIV-1 reverse transcriptase (RT) and anthrarufin were investigated by molecular docking simulations. The binding site of the mentioned protein is defined using AGFR software. The three-dimensional crystal structure of HIV-1 RT is downloaded from the Protein Data Bank (PDB ID: 4RW9). The molecular docking simulations are carried out with (E)-3-(3-chloro-5-(2-(2-(2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)ethoxy)phenoxy)phenyl)acrylonitrile (JLJ532), a non-nucleoside inhibitor, dolutegravir, nevirapin and antravarufin, as ligands. The molecular docking simulation is performed using the AutoDock 4.0 software. According to the obtained values of free energy of binding (ΔG_{bind}) and inhibition constant (K_i) antravarufin can be considered as a potential inhibitor of HIV-1 RT, since it possesses similar inhibitory potency as examined drugs.

Keywords: Reverse transcriptase (RT), anthrarufin, molecular docking, HIV-1

THE ROLE OF MODERN BIOTECHNOLOGY IN UNDERSTANDING SARS-COV2 INFECTION

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ABSTRACT:

The pandemic that appeared in 2019 caused by the new Sars-Cov-2 virus worldwide has led to huge health and socio-economic problems. At the very beginning of the pandemic, there was a lot of misunderstanding in many aspects of the effect of the virus on the human body. However, modern techniques of molecular biology and the use of PCR tests have helped to isolate the causative agent and confirming the presence of the virus. The aim of this paper is to show the importance of these techniques in virus isolation, identification of genes encoding viral particles, identification of new strains and the possibility of synthesizing viral protein plasmids and its application in-vitro. In Serbia, the synthesis and production of protein S (Spike) and N (nucleocapsid) protein of the virus was successful by recombinant hybridization techniques used for various in vitro tests. However, to understand the pathophysiological mechanism of disease development and immune changes associated with disease development, modern tests of immunity on a flow cytometer have made it possible to examine various cell populations in peripheral blood while the presence of cytokines by ELISA techniques. These techniques simultaneously with in-vitro cell cultures can show effects of pathogen on cell function. Depending on the concentration of C and N proteins, effects on human lung cells, on lymphocytes isolated from healthy volunteers as well as on samples from convalescents have been shown, and complex pathophysiological mechanisms of virus action on the human body have been confirmed. In addition, appropriate vaccinations were created in a short time to curb the pandemic. In this paper, it was also shown that after the vaccine is administered, the cell population of the immune system are stimulated, estimated by multicolor flow cytometry techniques. However, further research is needed to answer many other unresolved questions about the possibility of eradicating this disease.

Keywords: Flow cytometry, PCR, in-vitro cell cultures, S, N protein, SARS-Cov2 virus, , basic research, different technology

AQUATIC SPECIES IN STUDIES OF POTENTIALLY TOXIC ELEMENTS IN WATERS OF SERBIA

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ABSTRACT:

Aquatic environment contamination with potentially toxic elements is a severe environmental issue. In Serbia, it has been raising lots of attention in the last two decades in the scientific community. There has been an expansion of scientific papers in this field of research since 2010. Species used in studies of this type are called aquatic bioindicator species. It is reported worldwide that pollution with potentially toxic elements in aquatic ecosystems is often more reflected by high levels of those contaminants in macrophytes and benthic organisms compared to fishes. This study aims to present an overview of potentially toxic elements assessment research in Serbia. The results obtained in this study suggest that fish have become the main model for bioindication of water pollution with potentially toxic elements. The reason may lay in the fact that fish are at the top of the aquatic food chains. Also, many of them are in commercial use, and contaminated fish meat can pose potential health risks to humans.

Keywords: heavy metal, bioindication, invertebrates, fish

OVERVIEW OF THE GEOGRAPHIC DISTRIBUTION ENDEMIC EARTHWORM *HELODRILUS BALKANICUS PLAVENSIS* (KARAMAN, 1972) OF THE BALKAN

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ABSTRACT:

The objective of this paper is to analyze the literature data of records of Helodrilus balcanicus plavensis (Karaman, 1972) in order to present a general overview of its distribution on the Balkan Peninsula. Helodrilus balcanicus plavensis belongs to the broad range Balkan endemic. During the last 50 years, this subspecies has been recorded in localities in Montenegro as well as the western, eastern and southern parts of Serbia, Kosovo and Metohia, while it is sporadically found in Bulgaria. For now, the northernmost limit of the species is in the eastern part of Serbia (Žagubica), while the southernmost limit is in the south part of Kosovo and Metohia (Šar Mountain). Andrijevica (Montenegro) is the westernmost locality reported, while the easternmost limit is in Bulgaria (Pirin Mountain). Further, the habitats of the subspecies are restricted on river banks, near streams and in springs (in roots of aquatic plants), rarely in the mud under stones. Therefore, we classify subspecies H. balcanicus plavensis in the hydrophilic ecological category of earthworms. Overall, this paper summarized the knowledge on the ecology and distribution of a little known Balkan endemic subspecies H. balcanicus plavensis.

Keywords: Balkan Peninsula, distribution, earthworm, ecology, *Helodrilus balcanicus plavensis*

PRELIMINARY RESULTS OF GENETIC CHARACTERIZATION OF BROWN TROUT FROM THE "TOLIŠNICA" REPROCENTER, SERBIA

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ABSTRACT:

In this paper, the genetic characterization of 28 brown trout specimens from the "Tolišnica" reprocenter was performed in order to improve hatchery practices and avoid the negative effects of the stocking practices on wild stocks. The aim of the analysis was to distinguish specimens autochthonous for Danubian drainage in Serbia and the introduced specimens of Atlantic origin. Based on the PCR-RFLP analysis of the control region of mitochondrial DNA (CR mtDNA) and the nuclear lactate dehydrogenase gene (LDH), it was determined that the broodstock consists of specimens of the autochthonous Danubian lineage, allochthonous Atlantic lineage, and their hybrids. Based on the results, it is recommended that only five specimens with autochthonous Danubian RFLP profiles on both markers were kept in the broodstock. In order to form broodstock of autochthonous Danubian origin of appropriate size, further genetic characterization is necessary.

Keywords: *Salmo trutta*, hatchery broodstock, RFLP, CR mtDNA, LDH nDNA

INTRAMOLECULAR AMIDOSELENYLATION IN THE SYNTHESIS OF CONSTRAINED UNNATURAL AMINO ACIDS

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ABSTRACT:

In this paper use of intramolecular electrophilic amidoselenylation of unsaturated hydantoins for the construction of annulated bicyclic hydantoins, conformationally constrained precursors of substituted prolines is presented. In the case when alkenyl spirohydantoins were used as the substrates for amidoselenylation angularly fused tricyclic hydantoins are obtained. Reductive deselenylation and hydrolytic opening of the hydantoin ring of these products lead to fused bicyclic prolines, quaternary and constrained unnatural amino acids which can find application as peptidomimetics and also as intermediates in the synthesis of some natural products. Amidoselenylation of same substrates was also performed with in situ electrochemically generated selenium reagent. The reactions tolerate different substitutions at the unsaturated moiety and gave access to wide variety of derivatives.

Keywords: amidoselenylation, cyclization, unnatural amino acids, peptidomimetics

OPTIMISATION AND VALIDATION OF AN ICP-OES METHOD FOR DETERMINATION OF MERCURY IN WASTE WATERS AND WASTE

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ABSTRACT:

The method for determination of mercury (Hg) content was optimized using inductively coupled plasma optical emission spectrometry (ICP-OES) for rapid analysis of wastewater and waste samples, and whose performance is in accordance with the criteria of AOAC (Association of Official Analytical Chemists) and Eurachem . The instrumental parameters (argon flow rate in the nebulizer and sample injection flow) were optimized, and then analytical lines without spectral interferences were selected. The method was validated using Certified Reference Materials (CRM) Waste water (ERA) and sewage sludge (Trace Metals - Sewage Sludge 2). Accuracy expressed as repeatability (RSD%) was 5.64% (184,950 nm) and 5.96% (194,227 nm), and reproducibility (RSD%) was 6.78% (184,950 nm) and 10.11% (194,227 nm). Trueness i.e. Recovery was 99.1% (184,950 nm) and 99.4% (194,227 nm). Linearity (regression coefficient, R), as well as detection limits (LOD) and quantification limits (LOQ) showed that the difference in sensitivity between the selected two most sensitive Hg lines is approximate. In the calculation of the combined and extended measurement uncertainty, the contributions of bias derived from the used laboratory equipment, as well as the used CRM were taken into account. The estimated measurement uncertainties were 13.07% and 14.32%, respectively.

Keywords: Method validation, ICP-OES, Mercury, Waste waters, Environmental protection

QUALITATIVE AND QUANTITATIVE ANALYSIS OF CHIRONOMID LARVAE FAUNA FROM THE MAVROVO ACCUMULATION

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ABSTRACT:

In this graduate thesis, are presented the results of the research on the composition and structure of the chironomid larvae fauna of the Mavrovo accumulation in 2017/2018. In the investigated period 2017/18, the presence of a total of 26 species of the chironomid larvae fauna was determined. The dominant taxon in the investigated period 2017/18 is Tanytarsus sp. In addition, the taxa Procladius sp., Chironomus plumosus, Harnischia sp., Polypedilum nubeculosum and Orthocladius saxicola have been registered with a dominant participation in the community. The highest density of chironomid larvae fauna was recorded in the summer, a total of 1013.69 ind/m², compared to the lowest determined for the spring season which is only 9.78 ind/m².

Keywords: chironomid larvae fauna, qualitative composition, quantitative composition, Mavrovo accumulation

NATURAL RUBBER RHEOLOGICAL AND MECHANICAL PROPERTIES PREDICTION USING MACHINE LEARNING

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ABSTRACT:

The aim of this study was developing a Machine Learning (ML) model to predict natural rubber blend samples' rheological and mechanical properties. The natural rubber samples were filled with different filler type, commercially available carbon black and biochar produced by hydrothermal carbonization treatment of hardwood waste biomass. The samples were obtained following the same procedure and the filler content was varied from 0 to 50 phr, with a step of 10. The ML model was developed in a TensorFlow, open-source machine learning platform. The proposed model contained two hidden layers with 10 neurons in each of them. Rheological and mechanical properties were obtained for all natural rubber samples, and the samples containing 0, 10, 30 and 50 phr of the filler were used for training the ML model. The experimental data containing 20 and 40 phr of the filler were used for model validation. Numerical methods were used for model accuracy, and the obtained solution were validated with MAPE and MSE values being less than 4.2% and 0.16, respectively, for vulcanization data prediction. Comparing the experimental and predicted mechanical properties, the MSE values were less than 1.55. The proposed ML model is enabling the vulcanization data and mechanical properties estimation, leading rubber industry to significant time saving and cost-effectiveness.

Keywords: *natural rubber, vulcanization, mechanical properties, biofiller, machine learning*

MENTAL AND PSYCHOSOMATIC CONSEQUENCES OF JOB BURNOUT IN CRITICAL CARE NURSING PROFESSION: A CROSS-SECTIONAL STUDY

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ABSTRACT: *Critical care nursing is considered as one of the most stressful professions in the modern healthcare systems. Daily caring about vitally endangered and dying patients, associated with moral distress, the complexity of the job requirements and professional responsibilities, makes a solid basis for the development of job burnout, defined as „a breakdown of the psychological defence the employees use to adapt to and cope with the job-induced intense stress”. Considering this, we conducted a cross-sectional burnout study among 71 critical care nurses at a university hospital in Belgrade, Serbia, in 2017. We included several specific surveys in the test battery to determine the prevalence of chronic anxiety and the most common psychosomatic manifestation of burnout in the population of affected respondents (experimental group), and we compared the results to those found in a population of subjects who had no evidence of burnout symptoms at the time of the study (control group). Anxiety symptoms were nearly three times more prevalent in the experimental group, with high levels of anxiety registered in 88% of respondents. At the same time, psychosomatic manifestations were five times more common in the experimental group, affecting 97% subjects in total. The most common complaints were: headache (92% of respondents), sleep disorders (87.5% of respondents), gastrointestinal disorders (79% of respondents), and emotional/behavioural abreaactions (67% of respondents). The results of our study indicate the necessity of developing national burnout prevention programs in critical care nursing and similar healthcare professions with high levels of stress exposure.*

Keywords: *critical care nursing, job burnout, anxiety, psychosomatic manifestations*

CULTIVATION OF PERENNIAL LEGUMES AS A BASIS FOR SUSTAINABLE DEVELOPMENT OF AGROCENOSSES

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ABSTRACT:

In modern conditions of the development of agricultural production, the sustainable development of agroecosystems is primarily determined by their productivity, which depends on the correct selection of fertilizers and the alternation of crop rotations. At the same time, the constantly developing processes of soil erosion, systematic fluctuations of weather conditions during the growing seasons have a negative impact. In this regard, studies to assess the influence of various factors on the activity of nitrification processes and to improve methods for a more intensive accumulation of nitrate nitrogen in specific soil and climatic conditions are especially relevant. This article presents the results of a field experiment started in 2011 and carried out in three forage crop rotations with perennial legumes. Based on the results obtained, conclusions were drawn about the most productive structure of crop rotation and the composition of mineral fertilizers. The authors give the conditions under which agroecosystems develop steadily over a long period.

Keywords: *nitratnyy azot, crop rotations, productivity, protein, fodder crops*

***PSYCHOLOGY, SOCIOLOGY AND
POLITICAL SCIENCES; HUMANITIES;
ONLINE EDUCATION – E-LEARNING***

SOCIOLOGYCAL ASPECTS OF RELIGIOUS TOLERANCE IN GLOBAL SOCIETY

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ABSTRACT:

If mayor world religions teach that love is a commandment, which later includes love of the impatient, then honest conversation can be considered a good way to reach the religious other. If members of two or more religions are in a dispute or conflict, then the dispute cannot be resolved rationally. The only solution is for the two sides to reconcile and live side by side. We cannot always expect believers to love members of other faiths, but we can ask them to be patient. Religious tolerance manifested in the everyday relations between people, but also in the attitude towards different ideas, customs, as well as towards the different physical and mental characteristics of the believers. Intolerance of the different is one of the permanent characteristics of an authoritative person, but intolerance can also be a consequence of certain social circumstances. Although religious exclusivity, extremism and terrorism do not belong to the ethical teachings of the world's religions, we are still witnessing that they are one of the greatest challenges facing the global world. Interreligious tolerance may be the most difficult task, especially of the present. To accept something we are unfamiliar with, something that deviates from our tradition, customs and habits, is indeed a challenge. If there is no tolerance, there will be no coexistence. In order to be able to understand devotees of other religions, it is necessary to understand both their and our own view of things, if we need to live with them.

Keywords: *religious tolerance; religious conflict; religious exclusivity*

THE EPIC HERO AND KATABAZA: POSSIBILITIES OF READING THE ORAL EPIC POETRY

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ABSTRACT:

In this paper, we are interdisciplinary considering the motif of the hero's journey in Serbian oral epic poetry: 1) from the mythological-ritualistic aspect, via mythologem of descent into the underworld, i.e. katabaza which is transposed from the mythological narrative as a literary motif into folklore and authorial literature, and 2) from the aspect of the theory of possible worlds and transworld identities of postclassical narratology. Using the example of several epic poems we are determining the process of symbolic rethinking of the space of the afterlife and mythical patterns that function in the new environment. We observe the figure of the epic hero in different modalities of existence – possible worlds and possible identities, trying to point out that the mythical pattern is an integral element of not only the identity of the hero but also of the identity of the epic narrative. In addition, the application of contemporary narratological theoretical frameworks to the texts of oral literature proves to be a special challenge, but a necessary condition for understanding the relevance and vitality of this motif in contemporary narratives.

Keywords: *epic poetry, myth, folklore, katabaza, possible worlds, transworld identity*

ONLINE EDUCATION DEVELOPMENT DURING THE PANDEMIC

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ABSTRACT:

The COVID-19 pandemic significantly influenced on all the spheres of social life. All levels of education are not the exception. The epidemic situation in the Russian Federation as well as all over the world makes educational institutions develop new rules of the game. It defines the necessity to work out measures and procedures to keep up their continuous operations. The article is devoted to modern tendencies in online education, analyzing the role of the pandemic as the key driver of the process. In the paper the results of the extreme transition of studies to online environment during the pandemic are investigated, the experience of a number of the Russian universities is analyzed. Besides, a review of the most popular online platforms in the Russian Federation is formed; advantages and disadvantages are singled out. Obstacles on the way of development of online education are analyzed; practical recommendations aimed at overcoming the obstacles are given. Also the advantages of online format of studies from the perspective of educational path's optimization and additional flexibility of the process are considered in details in the article. Low level of human potential capitalization in Russia defines the necessity of education modernization, attraction of additional financing and certain adjustment of educational programs which will provide opportunities of flexible integration to international educational space.

Keywords: *online education, distant learning, educational path's optimization, a pandemic*

STUDY OF LITERATURE IN THE FRAMEWORK OF DIGITAL HUMANITIES

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ABSTRACT:

In this paper, we start from a young branch of science - digital humanities. We will point out the importance and need of this kind of mixture of digital and humanistic, considering that it enables us: access to cultural information, use, mixing and combining data, influence on the public, transformation of academic communication, improvement of education and the like. We will pay special attention to the study of literature within the framework of digital humanities, in the sense of whether and to what extent digital humanities is necessary for the study of literature and whether literature can be fully subjected to digitalization. We will show how digital humanities as such does not enter directly into the subject we are dealing with, but creates conditions for creating and researching digital tools that can be of help to us in analyzing the subject we have chosen.

Keywords: *digital humanities, literature, research, interdisciplinarity.*

POSSIBILITY OF REACTIVATION OF SUFFIX -ESA (WITHIN THE CONTEXT OF USE OF GENDER NON-DISCRIMINATORY LANGUAGE)

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ABSTRACT:

This paper considers possibility of reactivation of foreign motion suffix -esa in formation of nouns of semantic category nomina agentis et professionis, within the context of support to gender equality in language. From the perspective of derivation and semantics there are analyzed reasons of its passivation. It is stated that it is always added to the masculine nouns of foreign origin regardless of their final base sound, that it is deprived of diminutive – hypocoristic and pejorative semantic nuance, that is that it is formatively unambiguous, but that the increase in productivity of profession nouns with this formation suffix blocked. It is concluded that the possibility of its reactivation does not decrease formal and grammatical but semantic factors, above all formation synonymy (the same function is conducted by domestic motion suffixes -ica, -ka, -kinja). Cause of its withdrawal from the formation field of semantic category of profession and occupation is also association to the existing derivatives on -esa, denoting female noble titles.

Keywords: *suffix -esa, reactivation, gender non-discriminatory language*

AMAZEMENT AND STORYTELLING IN *THE NOVEL OF LONDON* BY MILOŠ CRNJANSKI

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ABSTRACT:

Affection for the unusual, love for the strange or surprising is the beginning of philosophy, which is "the love of observing the foreign, strange, new, different or other, anything that could be associated with the wise as unusual and different from current experience" (Milić 2007: 19). Wanting to know everything about London, the hero of the Novel about London will discover the strangeness of what that city and he as its antagonist are becoming. Feeling the difference in relation to himself, the hero marvels at the difference he feels in his becoming. Astonishment is not knowledge, but thinking - the desire to think and the way of thinking - because the position of a man who is in some becoming, "equal and different", cannot be seen from the perspective of knowledge about this paradox, "but wondering - examining - what happened to him" (Milić 2009: 35). The opinion and story in the Novel about London is a circle around the place of ignorance, approaching the point of hopelessness or impassability. The hero changes his mind, hesitates, wonders, because he begins to feel the whole of his path and the whole of the world in which that travel thread is outlined as a knot of aporia. In this paper, we will examine examples in which the experience of wonder shapes the existential experience of the heroes of the novel, but also those examples according to which wonder can be understood as immanent to the story and narration.

Keywords: wonder, other, foreign, storytelling, hero

DIGITAL TRANSFORMATION IN THE HIGHER EDUCATION SYSTEM: SITUATION, EXPERIENCES, ADVANTAGES, SUCCESSFULNESS AND OPPORTUNITIES OF DISTANCE LEARNING AT THE FACULTY OF AGROBIOTECHNICAL SCIENCES OSIJEK

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ABSTRACT:

The paper provides an overview of the current situation of teaching courses, the functioning of teaching, the implementation of teaching and distance learning at the Faculty of Agrobiotechnical Sciences Osijek. For the purpose of this paper, research has been conducted regarding the satisfaction with distance learning, current state, challenges, and opportunities in two academic years (2019–20 and 2020–21). In this paper, the experiences with the implementation of distance learning, assessment, and evaluation of performance of the first-year students attending the English Language teaching module of a bachelor study program are presented. Accordingly, two analytical measuring instruments have been designed and implemented at the Faculty in order to review the current situation of digitization, advantages, and disadvantages for the purpose of emerging needs and trends in higher education, i.e., for the purpose of adaptation to new social norms and codes of conduct. The first instrument was intended for students and the second one was intended for academic staff. The results of the studies point to the challenges and opportunities in distance learning related to digital education, but also to IT support. Further to the analysis and comparison of research results, recommendations followed, directed toward the implementation of new platforms in certain modules, as well as toward adjusted teaching methods within the distance learning system. New knowledge and innovative technologies are namely a prerequisite for the development of digital transformation which should offer greater opportunities and more extensive knowledge in accordance with a globalized environment.

Keywords: distance learning, digital transformation, higher education, teaching methods, English for Specific Purposes

PROFESSIONAL IDENTITY AND INTEGRITY IN THE PEDAGOGICAL CONTEXT

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ABSTRACT:

The current issue in the conditions of the COVID-19 pandemic has become how to make inevitable changes in professional roles constructive, without at the same time leading to the loss and violation of professional identity and integrity. In this paper, we have tried to answer this question by emphasizing: redefining the adopted rules of conduct and functioning in the society of knowledge, the importance of transversal competencies and the importance of professional self-assessment. Professional identity can be defined as a set of values, attitudes, and beliefs about one's own vocation that includes self-knowledge, self-assessment, and awareness of one's own professional competencies. Professional identity and integrity could be preserved through honest and self-critical review of one's own performance, assessment, and recognition of one's own strengths, as well as one's own weaknesses, on the basis of which areas of possible progress and development are revealed. Through action, which is an important feature of professional identity, an individual takes responsibility to proactively influence his/her professional identity and integrity. Professional integrity is conditioned by the professional identity of the individual, but also of the collective that deals with a certain vocation. The society of knowledge requires and imposes a continuous (re) construction of identity, both personal and professional, implicitly and explicitly affecting the professional integrity of individuals in pedagogical and any other context.

Keywords: *professional integrity, professional identity, self-assessment, society of knowledge, competencies.*

SOCIO-PHILOSOPHICAL UNDERSTANDING OF VALUES AT THE BRINK OF THE NINETEENTH CENTURY AND AT THE BEGINNING OF THE TWENTIETH CENTURY: A SOCIO- HISTORICAL ANALYSIS

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ABSTRACT:

In this paper, the author conducts a sociological analysis of the category of "values" The author, relying on domestic and foreign researchers, determines the definition of the concept of "value" in sociology. Studying the category of "value" in sociology, the author came to the conclusion that in sociology there are two main approaches to the study of values, and also that values are a product of social activity and are associated with the functioning of a special kind of social mechanisms for regulating human relationships and actions by legitimizing preferences in social space. The state of the modern world is such that the value of a person is not the original given, but the acquired property. The way of acquisition of values by people is historically determined way of its activity. As a result, one of the main problems of modern society is that when solving moral issues it is necessary to include in their resolution the whole complex of human existence and activity. Therefore, in justifying an act or decision, it must be seen in the context of the principles and norms in which the individual arrives. Without understanding and awareness of the way of life of the society in which the individual arrives, it is difficult to give a clear moral or any other characteristic of his behavior. In his work, the author will proceed from the understanding of the dialectics of objective and subjective values, namely adhering to the idea of relational approach. If we talk about the direct relational sociological approach, we can say that it proceeds from the fact that the practices of social relations constitute a kind of aggregate whole society, and only from the knowledge of this system connection can be derived any specific relationship of social life of people and their values.

Keywords: *value, value orientations, subjectivism, objectivism, personal values, social values, neo-Kantianism..*

MODERN APPROACHES TO EDUCATION IN THE VUCA-WORLD

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ABSTRACT:

The current state of the world is increasingly being characterized as the VUCA world. The term new appeared in the third industrial revolution. VUCA - the world can be defined as follows, Volatility - instability; Uncertainty - uncertainty; Complexity - complexity; Ambiguity is ambiguity. Our reality has changed. It has become highly volatile, uncertain, unpredictable, complex, contradictory.

The peculiarities of the VUCA-world touched upon educational and career technologies. The author examines in the article how the new modern VUCA model affects the principles in the field of higher education and how the labor market requirements for the graduate model are changing. A new concept of education, lifelong learning, is emerging - this is lifelong learning. Education is the result, the fixation of achievements, the mastery of unique competencies, the development of hard skills (knowledge, the results of using knowledge) and soft skills (personal skills). As a result of such a model of the educational process, under the influence of the VUCA-world, the professional trajectory of a graduate allows you to change the type of activity several times, to move from one sphere to another. Today, educational technologies must adapt to the rapidly changing environment and value system VUCA-world

Keywords: *VUCA-world, lifelong learning, soft skills, hard skills, education, graduate model, educational technologies, digitalization of education*

FILM LITERACY IN DIGITAL MEDIA REALITY

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ABSTRACT:

Today, almost everyone has the ability to capture and broadcast motion pictures over the web. The camera has become accessible and ubiquitous, but the sociocultural implications and possibilities of this fact are still poorly understood. Information and communication technologies should develop in a system of mutual interest of society, its groups and individuals to achieve harmony through mutual understanding based on mutual respect and awareness of various social forces. There are many contradictory assessments of the quality of visual information on the web. Mass production of moving images in modern mass media, especially on the Internet, is of low quality. These images are similar, the camera angles and perspectives are standard, the plot of the movie are the same, if any. Written literacy shouldn't pass the baton to massive visual illiteracy. The visual in the modern world in terms of its ability and social significance can today play the role that written literacy played in the "linguistic era". The educational and humanistic potential of cinematography must be used more systematically.

Key words: film literacy, visualization, mass media, intercultural interaction, internet, humanistic values.

CHALLENGES OF ONLINE LEARNING OF SOCIAL WORK STUDENTS DURING THE COVID-19 PANDEMIC

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ABSTRACT:

The paper deals with the research of attitudes and the degree of satisfaction with online teaching among social work students at the Faculty of Philosophy in Novi Sad. Due to the COVID-19 pandemic, in the last two years, most teaching units have been maintained through electronic communications and various platforms designed to hold classes remotely. Regarding that, this was the dominant way of working and communicating between educators and students, there is a need for deeper research and interpretation of the data obtained. The focus of research is to examine students satisfaction and in general the capacity and potential of this way of teaching. The results of the research were obtained through a questionnaire created especially for this purpose. The first part of paper deals with theoretical presentations and research that have so far explained the social phenomenon of online teaching. Critical interpretations of the scope, but also the limitations of this way of working are analyzed. After explaining the derived research methodology and presenting the results, the authors analyze this phenomenon in the context of the COVID-19 pandemic and interpret students attitudes regarding online learning. Accordingly, the challenge of online teaching is understood as a theoretical model, which needs to be explained, shaped and explored its social implications, but also as a practical challenge that greatly affects the entire human civilisation at this time.

Keywords: *online learning, challenges, attitudes of social work students, pandemic COVID-19.*

EMOTIONAL SECURITY AT WORK AS A POTENTIAL FORCE IN HUMAN RESOURCES

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ABSTRACT:

In any organization human resource management is very important part of managing good job. Very important is the know how employee's developed relation between his workplace if we want to examine dimension of his productivity. One of main factors is his personality for some jobs. Other is his self-confidence and good education. In this article we would try to deal with emotional confidence at work as a evaluate employee's relation regarding her/his competencies that qualify her/him for achievement at work. We supervise a research of emotional confidence at work in two organization. Our researches showed that measure of emotional confidence at work is a good prove of good job result at work, satisfaction at job, and willingness for investing to make certain efforts an achieving new goals. This feature is accompanied by employee's willingness to triumph over a critical situation on work. Managements have a task to extract conclusion by assessment emotional confidence of employees at work and to find a strength in human resources, because if HR good estimate employee's for job position in company it will provide success and good results.

Keywords: *emotional, security at work, human resource management, training in organization, self-confidence,*

ENGLISH FOR SPECIFIC PURPOSES SYLLABUS DESIGN: A CASE STUDY OF THE LANGUAGE COURSE FOR MANAGERS

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ABSTRACT:

Dynamism of business in the third decade of the 21st century is a result of global macroeconomic trends such as globalization, transition processes and capital consolidation. These processes have brought with them the need to use one language that will quickly and efficiently remove all language barriers between nations and markets. English is a lingua franca of international banking, both in internal and external bank communication, as is the case with many other professional fields worldwide.

The subject of this paper is a review of a case study based on design of a tailor-made ESP syllabus as the backbone of the course for bank managers whose mother tongue is not English. The paper describes in detail all the steps taken within the mentioned process – the steps being based on modern theoretical and practical achievements in glottodidactics and methodology of teaching and learning languages for specific purposes. In our research we have used quantitative and qualitative scientific methods. The result of the research is presented in the form of the unique syllabus of English for specific purposes course for bank managers. The final part of the paper analyzes subsequent stages in the process of implementation and evaluation of the language course in question.

Keywords: *English for specific purposes, syllabus design, management, glottodidactics*

COULD LANGUAGE LEARNING STRATEGIES AND AFFECTIVE FILTERS BE DETERMINANTS OF EFL PROFICIENCY DURING ONLINE LEARNING SETTING?

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ABSTRACT:

During March of 2021. fifteen graduate students of Early and Preschool Education participated in research aiming to investigate their self-assessment of the competences they had gained during online English as a foreign language (EFL) practicum at University of Slavonski Brod in Croatia. The results were compared to the results of tests during the evaluation of the outcomes they had achieved at the end of the semester. The comparison revealed that although the participants expressed satisfaction with the progress they had made in all four language skills, they were overconfident in their translation skills and had also underestimated their knowledge of English syntax. The paper presents the overall results of the gathered data but also the standpoints on which to base hypothesis for further larger scope research which would relate to language learning strategies and affective filters in an online learning setting among university students during Covid-19 epidemic times.

Keywords: *competences, online learning, EFL, language learning strategies, affective filters*

USE OF ICT IN TEACHING ENGLISH LANGUAGE

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ABSTRACT:

Language acquisition is subject of increasing interest in modern society. Since language represent rather efficient medium of communication, language competences have significant attention among students and their professor globally, and the competence to communicate in an efficient manner in foreign language represents grounded aim for language acquisition.

Due to greater use of online tools and new styles in learning, as well as the process of informatization of modern era, apart from four skills: reading, writing, speaking and listening, developing in acquisition of any language, fifth skill also emerged – use of digitalization. Role of technology in English language acquisition is today, in modern world, recognized as vital, and its significance is best described through the easiness and timely approach to information, for students as well as for their lecturers. This paper in more details discuss the use of IC technologies in the processes of teaching and acquisition of English as foreign language, primarily at the faculties.

Keywords: *digitalization, foreign language acquisition, English as foreign language, acquisition of English language*

APPLICATION OF AGILE METHODOLOGIES IN EDUCATION

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ABSTRACT:

One of the biggest challenge that teachers at all levels of education face is to keep the attention and commitment of students to achieving the defined goals and outcomes of the subject. The crisis caused by the Corona virus pandemic further distanced students from traditional ways of transferring knowledge and requires teachers to apply new tools and methods to make their lectures more attractive to students and motivate them to persevere in acquiring new knowledge and skills. The traditional way of organizing teaching based on lectures and exercises can be replaced by an agile way of organizing with a student in the center based on the agile principles of teacher-student interaction, continuous improvement, collaboration between students and constant response to change. The paper presents modern methodologies in education inspired by agile software development, agile manifesto and agile principles that can be applied in order to overcome previously defined problems in the organization of teaching. Also, software tools are described that can significantly reduce the barriers that have arisen in online teaching caused by the pandemic.

Keywords: *agile methodologies, agile education, agile principles*

NATIONAL CULTURE - DETERMINANT OF ENTREPRENEURIAL ACTIVITIES

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ABSTRACT:

National culture is one of the factors which to a large extent affects the business of modern enterprises. Keeping in mind that entrepreneurship is the holder of business activities we should identify factors that are affecting it. The author, in his work, first gives an overview of different perspectives when it comes to defining the national culture. For the explanation of the relation between national culture and entrepreneurship, we use Hofstede's module, in other words Hofstede's dimension of national culture. In that context we analyze the effect of the national culture on entrepreneurship activities. Taking into account the demand of today's society, primarily the process of globalization and the current market, it's necessary to recognize the way in which national culture influences entrepreneurial activities and identify those dimensions of national culture that contribute in the making of positive results in entrepreneurship.

Keywords: *national culture, entrepreneurship, globalization, management, enterprise*

THE SCIENTIFIC METHOD OF HUMAN CLONING: LEGAL AND ETHICAL CONSIDERATIONS

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ABSTRACT:

The increasing awareness of the speed of technological evolution creates new and greater pressure to the Law in order to meet the challenges emerged to a new world. The basis of legal changes depends on acceptable changes in fundamental ethical issues. This is most evident in the fields of Genetics and modern Biotechnology, where the issue to be regulated depends on technological applications such as that of human cloning.

The exploitation of the information related to the biological composition of the species creates new foundations of fundamental concepts such as life, reproduction and death, and raises important issues such as the permissibility of human intervention in the reproductive process, in the human genetic material, and in nature in general.

This paper studies the application of the scientific method of human cloning, focusing on both biology data and legal regulation at international level, in order to demonstrate, through a philosophical reflection, the relevant ethical implications. In this respect, it will be further attempted an ethical approach of the human action in a constantly changing environment, of the contrast between ‘natural’ and ‘made’, as well as of the boundaries between ‘good’ and ‘evil’.

Keywords: *Ethics, Genetics, Law, Reproductive Cloning, Therapeutic Cloning*

LGBT IN BOSNIA AND HERZEGOVINA - CRIMINAL ASPECT IN DISCOVERING AND PROVING FELONIES

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ABSTRACT:

There is more talk today in public discourse about hate crimes, especially felonies committed against LGBT population, so therefore this topic is very present not only among scientific workers, security experts, media but also society in general. Interest for these incidents is based on the consequences and the reflection these action have in society. Great accent is put on particularities in discovering and proving these felonies that are conditioned by many different factors. Considering this, there is a great burden on the police and the demand for special criminalistic approach in shedding light and proving felonies and perpetrators. Besides, the police independently and in cooperation with other subjects and relevant organs must aim to mount down the tension and to build trust among the actors after felony is committed. The aspect of prevention of these actions great importance lies in abilities for timely regogniting indicators for hate crimes. This paper has a goal to define felonies committed against LGBT population, their characterizing, and to point out the significance of criminal aspect of police work in Bosnia and Herzegovina in discovering and shedding light on these felonies.

Key words: LGBT, security, felony, police, hate

***ECONOMIC AND LEGAL SCIENCES;
MANAGEMENT; TOURISM AND
HOSPITALITY***

THE MECHANISM OF ENSURING THE ECONOMIC SECURITY OF BUSINESS ACTIVITY: FEATURES OF THE STRUCTURE AND CONTENT

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ABSTRACT:

The study is devoted to the development of a mechanism for ensuring the economic security of entrepreneurial activity, the logical structure which made it possible not only to model the process of its implementation, considered as a separate business process, but also to justify the selection of separate functional-subject areas, the regulation of which will increase the effectiveness of its application. With the help of the consistent application of both theoretical research methods (synthesis, analysis, abstraction) and empirical (modeling), a mechanism has been developed to ensure the economic security of entrepreneurial activity, the structure and content which is distinguished by a stable relationship between the elements of the theoretical, methodological, functional and practical blocks.

Keywords: *economic security of business, threats to economic security, countering threats to economic security, business process of ensuring economic security, a mechanism for ensuring economic security*

STUDIES OF CORPORATE ENTREPRENEURSHIP: THE CASE OF WESTERN BALKAN COUNTRIES

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ABSTRACT:

The lack of empirical studies in domain of corporate entrepreneurship has been motivated the authors to start a research over ten years ago. The corporate entrepreneurship is an actual theme in developed as well as developing economies. In this paper, the review of past studies will be presented. Western Balkans region has been chosen as representative sample of transition economies in Europe with similar external environments. The Corporate Entrepreneurship Assessment Instrument (CEAI) has been used according the written authorization given by authors (Kuratko et al., 2014). The results showed validity of CEAI in Western Balkan region. The limitations and future research agenda will be presented, too.

Key words: *corporate entrepreneurship, Western Balkan region, strategy, innovation, Serbia*

ABSENTEEISM - ABSENCE FROM WORK

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ABSTRACT:

Absence management involves the adoption of certain rules and procedures that allow the company to identify, monitor and control absences from work in order to minimize them. Organizations need to create an environment for "good work" for employees, providing them with the necessary means for life, career development, skills and personal fulfillment in order to be more productive. The level of absence from work tells us what are the general conditions and communication within the company, what is the degree of motivation or satisfaction at work, and in other words it presents the image of a company. Protection measures, quarantine, stress as well as psychological and mental health caused by the Covid19 crisis have further influenced employee behavior. The paper analyzes absenteeism-absence from work, whose costs are in second place of the total labor costs in the organization, immediately after the cost of wages. The analysis on the level of Montenegro and the losses caused by this phenomenon are presented.

Keywords: *absenteeism, absence from work, Covid19 crisis, costs of absence, losses from absenteeism*

PRACTICAL BENCHMARKS REGARDING THE ASSESSING OF ABUSIVE CLAUSES IN BUSINESS-TO-CONSUMER CONTRACTS

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ABSTRACT:

This paper approaches the problematics of the assessment of abusive clauses in B2C contracts, in conjunction with the relevant legal rules of national law, with the essential benchmarks of the CJEU jurisprudence. Firstly, in order to retain the abusive nature of contractual clauses, even if it is part of the main object of the contract, the encompassing of several criteria is required; the contract concluded between a consumer and a professional is expected to meet, cumulatively, the following conditions: (1) not to have been negotiated by the consumer; (2) be likely to create a significant imbalance between the rights and obligations of the parties, contrary to good faith and to the detriment of the consumer; (3) not to comply with the criteria of transparency and intelligibility. The first step in the analysis is to identify the clauses which form part of the main object of the contract, since in their case any analysis from the point of view of unfairness is admissible only in so far as they have not been expressed in plain language, taken into account the foreseeable use of the product. Saliently, the clauses which are ancillary in relation to those which define the very essence of the contractual relationship do not fall within that concept of 'principal object.' It is for the national courts to determine whether a clause constitutes an essential element of the debtor's performance, having regard to the nature, general scheme and provisions of the contract and the legal and factual context in which it is entered into, or is merely an ancillary obligation, in relation to those that define the essence of the B2C contract.

Keywords: abusive clauses, consumer, B2C contracts, unfair terms

PROCESS - ORIENTED STRATEGIC MAP AS A CAUSE OF THE EMPLOYEES' LOW - LEVEL MOTIVATION VALUES, CAUSED BY COVID-19 PANDEMIC

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ABSTRACT:

The operation and development of multi – dimensional business and management processes of modern maritime companies have been analysed in this work. A modern, multi – structural BSC concept model has been used in the research. This model belongs to a group of modern concept systems for undeveloped maritime companies' performance measurement. The aforementioned companies have not practically used exact analytical and simulation methods, but the analysis and synthesis methods, according to the logics of "current management of external stakeholders." The research represents a systematic theory which is only a basis for further analysis and settlement of problems caused by the Covid – 19 pandemic.

Keywords: *improvement, BSC model, management of business performances, metrics of the processes, key performance indicators*

MODERN WAYS OF IMPROVING THE RELATIONSHIP BETWEEN CAPITAL OWNERS, MANAGEMENT AND EMPLOYEES

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ABSTRACT:

The relationships that exist and develop in the process of work have always been complex and have resulted from antagonistic positions from which capital owners, management and employees have entered. The predominant goal for the former is to increase profits, and for employees to have higher salaries and better working conditions, which means higher business costs, and thus directly oppose their interests. While earlier disputes were mostly resolved by physical conflicts between employees and employers, negotiation, dialogue and awareness of the existence of parties that should negotiate instead of conflicting gave birth to new, modern theories of management and improvement of internal relations and directly contributed to the creation of labor relations. in companies that aim to effectively and efficiently use the most important resources at their disposal - human resources. Having in mind the above, this paper analyzes the process of negotiation of capital owners, management and employees, its legal regulation, international norms and standards, and points out its importance for domestic companies striving to create good internal interpersonal relations, quality organizational culture and climate. and competitive advantages based on human resources in an increasingly demanding market.

Keywords: *collective bargaining, internal relations, dialogue*

SUBCONTRACTOR SELECTION BASED ON FINANCIAL PERFORMANCE INDICATORS

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ABSTRACT:

The successful selection of subcontractors is a crucial process for any construction project. Many factors affect the subcontractor selection, and in most cases, the subcontractor is chosen based on the lowest bid. However, selecting an improper subcontractor can cause delay of works and delay in the project, low work quality, and additional resources. As the research methodology, a survey was carried out to 30 project managers, construction managers and site engineers that participate in the construction sector as General Contractor. This survey aimed to obtain an evaluation of 20 subcontractors based on the evaluator's experience. For each subcontractor, financial performance indicators were calculated. The paper presents the connection between the survey results and financial ratios, which can improve the subcontractor's selection and General Contractor's decision-making process.

Keywords: *construction industry, subcontractor, performance evaluation, financial indicators, decision-making*

MAKING STARTUP-STUDIO AS A KEY ELEMENT OF INFRASTRUCTURE TO BACK UP YOUTH ENTREPRENEURSHIP

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ABSTRACT:

Building and developing entrepreneurial culture among young populations at all levels of education is one of the major tasks of the government. Solution to the problem is feasible and requires the conditions that allow to develop student entrepreneurial competence in universities. The article discusses the key role of entrepreneurship as a driver to the growth of global economy. Youth entrepreneurship is in the focal point of the article and viewed as an important personnel resource that will underpin effective development of entrepreneurship. The notion and content of technological entrepreneurship is also determined and described. The article analyses the results of key risks factors having an impact on the startup success. The significance of making a startup as a key element of infrastructure to backup youth entrepreneurship provides the ground for diminishing risks and removing barriers to student ideas' commercialization. Startup-studios are classified into types related to the mechanism of forwarding startup ideas and according to instruments of fund raising to help startup development. The article attests to the experience of Udmurt State University (Izhevsk, Russia) and other Russian higher education institutions that provide required conditions for the development of innovative student entrepreneurship and increasing intellectual deliverables as well as creating endowment funds.

Keywords: *startup-studio, youth entrepreneurship, startup, innovations, technological entrepreneurship*

THE ROLE OF MANAGERS IN THE DIGITAL TRANSFORMATION OF THE ORGANIZATION

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ABSTRACT:

Digital transformation represents reality for modern organizations. As a comprehensive change that leads to the development of new business models and contributes to sustainable value creation, digital transformation implies not only the successful implementation of the current digital technology within the organization, but also its successful alignment with the organization's strategy, structure, culture as well as with the employees' knowledge and skills levels. Only the balance between mentioned categories allows the manifestation of all the advantages that a modern organization can provide through the process of digital transformation and successfully implemented digital technology. Managers have a crucial role in establishing that balance and directing the entire digital transformation process of the organization. After specifying the nature and the character of digital transformation and highlighting its fundamental advantages, the paper aims to point out some of the key activities managers undertake to lead the entire process of digital transformation successfully and, on that basis, to provide the organization with all the benefits of that process.

Keywords: *digital transformation, digital technology, management, organization*

THE IMPACT OF THE GLOBAL PANDEMIC ON ECONOMIC GROWTH AND STRUCTURAL PERFORMANCE OF THE ECONOMY OF THE REPUBLIC OF SERBIA

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ABSTRACT:

The focus of the research is focused on the analysis of the impact of the recession, caused by the global pandemic, on economic growth and structural changes in the economy of the Republic of Serbia. Thanks to extensive and timely intervention packages to help the economy and the population, the recession was minimal in 2020, but macroeconomic performance deteriorated (increased fiscal deficit and external and public debt) and structural reforms in the economy halted. The paper analyzes the degree of resilience of the economy of the Republic of Serbia, the impact of the recession on key macroeconomic variables, the entrepreneurial sector, the qualitative performance of the economy and changes in the sectoral and property structure of the economy. Special emphasis is placed on the analysis of the effects of the recession on the technological performance of the manufacturing industry, as well as on the analysis of the degree of resilience of new economic sectors (ICT, creative and cultural industries). The methodological tools in the paper are based on the structural and dynamic analysis of key indicators of economic-financial and statistical analysis of the economy in the pre-recession period (2015-2019) and in the recession 2020.

Keywords: *recession, economic growth, macroeconomic performance, structural change*

SPORTS NOSTALGIA TOURISM ON THE EXAMPLE OF FOOTBALL CLUBS IN ITALY

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ABSTRACT:

The relationship of tourism with other activities, interests and sectors has led to the emergence of special interest tourism. Thus, sports tourism originated through the field of sports with its own characteristics and motives that attract visitors. The authors refer to the phenomenology of one of the emerging forms of sports tourism, sports nostalgia tourism, using the methods of analysis, induction and analogy. The first part of the paper deals with the concepts of nostalgia from the psychological context, especially in sports. The second part of the paper is dedicated to the characteristics, typology and new trends of sports tourism with special emphasis on sports nostalgia tourism, while the third part concretizes the theoretical knowledge by analyzing examples from the practice of Italian football clubs.

Keywords: *sports tourism, nostalgia, sports, football, special interest tourism*

COMPARATIVE ANALYSIS OF ENTERTAINMENT CONTENT CONSUMERS ON INTERNATIONAL AND REGIONAL LEVELS

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ABSTRACT:

In the article the types of entertainment content consumers are studied. A review of methods for analyzing the customers types of digital media content is performed. The data collected based on the questionnaire are analyzed using methods of multivariate statistical and factor analysis. The factor loadings matrix was built and its interpretation was offered. The following homogeneous groups of consumers were singled out: video-game fans, fans of the sport, music lovers, TV addicts. The results obtained are compared with the conclusions of the international company PWC. The perspective directions of the development of entertainment content are offered and proved.

Keywords: *consumers, entertainment content, factor analysis, customer management*

ETHNOPARKS AS A STRATEGIC RESOURCE FOR DEVELOPMENT OF CULTURAL TOURISM

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ABSTRACT:

In the modern world, in conditions of active intercultural exchanges, two tendencies are more and more persistently manifesting themselves: first, this is the globalization of all processes and the leveling of cultural differences; the second is the preservation and updating of the nationally distinctive cultural experience, traditions and way of life. The second tendency is expressed in the striving of various cultural communities for diversity, for weakening integration into global processes, for greater local and cultural autonomy. As a result, the need to popularize ethnographic sites as strategic resource of cultural tourism.

The object of the research is the activities of ethnoparks to preserve and maintain ethnocultural identity. The article provides an overview of ethnoparks in certain regions of the Russian Federation an assessment of satisfaction with ethnotours based on visitor feedback is given.

The article shows the activities of ethnoparks on the introduction of ethnocultural projects, outlined the ways of integrating tourism and educational activities. Based on the results of the study, motivational factors have been identified for attracting university students to the development of ethnocultural projects for the development of cultural tourism in regions belonging to the cultural periphery. The methodology of cultural mapping on the example of the resources of the Siberian region is described and recommendations on the use of manifestations of local original culture for the formation of new tours and offers are developed.

Keywords: *cultural tourism, ethnoparks, ethnocultural projects, cultural periphery, cultural mapping*

THE CONCEPT OF BUSINESS CONTINUITY MANAGEMENT IN THE FUNCTION OF DEVELOPMENT OF THE RESISTANCE OF THE ECONOMY AND SOCIETY IN EMERGENCY SITUATIONS

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ABSTRACT:

Various emergencies most often cause damage and business interruptions, which disturbs the supply and service of society with basic products and services, then further leading to spreading and deepening of the crisis. The organization's ability to continue to deliver products or services after a disruption that disturbs the organization's regular operations is recognized as business continuity management which is one of the most important measures for building community resilience and mitigating emergencies. The paper analyzes the concept of business continuity management in the function of building the resilience of the economy and society in emergency situations. Also, the authors analyze the needs and possibilities of maintaining business continuity in emergency situations, as well as the elements of the business continuity management process with a focus on the development of business continuity strategy and plan.

Key words: *business continuity, emergencies, resilience, risk management, critical infrastructure*

TERRITORIAL PLANNING FOR SUSTAINABLE DEVELOPMENT OF TOURISM REGION

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Russia

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ABSTRACT:

In modern conditions, the role of taking into account environmental factors and recreational potential of a territory increases when drawing up territorial planning schemes. The article analyzes approaches to territorial planning of tourism development taking into account environmental factors. The factors influencing the sustainable development of tourism are classified. On the example of the Novosibirsk region, the problems arising in the preparation of schemes for territorial planning of municipalities, taking into account the recreational potential, are identified. The technology of drawing up master plans for territorial planning of tourist territories is considered.

Keywords: *tourism, spatial tourism development, environmental factors, sustainable tourism development, spatial planning schemes*

MANAGEMENT OF MARKETING MIX INSTRUMENTS IN PHARMACIES DURING THE COVID-19 PANDEMIC

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ABSTRACT:

Pharmacies are the only health institutions whose activities are focused on providing products and services for the improvement and preservation of health. A highly competitive retail pharmaceutical market requires management skills of all functions, appropriate marketing strategy and a combination of marketing mix instruments. In conditions of crisis such as the COVID-19 pandemic, pharmacies are facing market and public health challenges - preserving and improving public health.

The aim of this paper is to present the management of marketing mix instruments, such as product and service promotion, price changes, introduction of new services and sales channels in pharmacies during the COVID-19 pandemic in Serbia.

The study included 196 pharmacists employed mainly in state city pharmacies (69.90%), medium-sized (47.96%). A combination of several promotional activities is mentioned by 83.67% of respondents, such as increasing the availability of the service and home delivery of medicines, developing an online service. About half of the respondents (47.96%) analyze the activities of the competition, 61.23% correct the prices of products, 93.88% recommend additional products for health protection. Combined with other goals, improving patients' knowledge of the virus about the SARS-CoV-2 virus and protective measures is a priority promotional goal for 57.14% of pharmacists. Over 85% of respondents notice the positive effects of the implemented activities.

With a quick response to the crisis, an appropriate combination of marketing mix instruments, as well as a balance of market and health concepts, pharmacies can achieve a differentiated advantage over the competition, while maintaining their priority role - preserving and improving the health of the population.

Keywords: *pharmacies, management, marketing mix, promotion, public health*

EVALUATION OF WEBSITES AS A DIGITAL COMMUNICATION CHANNEL IN THE HOTEL INDUSTRY

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ABSTRACT:

The aim of this paper is to analyze the content of web presentations of hotel companies to determine how to use this digital channel of communication with potential service users, with an emphasis on interactivity and establishing dialogue. The conducted qualitative research included 93 hotels operating in the territory of the city of Belgrade. According to the principles of digital dialogue (Kent and Taylor, 1998), the paper analyzes the following variables: site usability, dialog loop, ease of use, revisit and retention of visitors. Acceptance of web presentations, as interactive channels for dialogue with stakeholders, is a trend present in all service industries, including the hotel industry. The user's perception of the interactivity of the hotel's website affects the perceived value and intention of the user to revisit the hotel's website in the future. The research contributes to the scarce literature in the field of digital transformation of the hotel sector of the Republic of Serbia.

Keywords: *web presentations, digital communication, digital transformation, hotel industry, Belgrade*

EVALUATION OF BRAND MEANING AMONG CHILDREN AND ADOLESCENTS

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ABSTRACT:

Global brands are powerful means of influence on consumers; they communicate ideas which are offered by producers of goods and marketers and reflect the general state of the market they operate on. Children and teenagers are susceptible to the influence of numerous marketing and advertising incentives, and, when growing up, they become full-fledged consumers, retaining the shopping habits and preferences acquired in childhood. In the paper the different approaches to estimate of youths' brand meaning are analyzed and the hierarchical structure of factors influencing the brand meaning is formed. A broad-scale research of Russians comprehensive secondary school students on fast-food brands has been conducted. Factor's hierarchical structure is evaluated with AHP-Saaty's method, and the most significant factors are revealed. The survey data allowed postulating the model for describing brand meaning among children in terms of brand awareness, brand logo recognition, and consumer impression of brand advertising.

Keywords: *brand, perception, brand meaning, brand management, children marketing, analytic hierarchy process*

FINANCIAL REPORTING OF MONTENEGRIN INSURANCE COMPANIES- CHALLENGES OF DIGITAL TRANSFORMATION

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ABSTRACT:

The paper deals with the digital transformation and its impact on the financial reporting of insurance companies in Montenegro. The current COVID-19 pandemic has definitely accelerated the process of digital transformation in all segments of business on a global level, including the business of insurance companies. However, this process was accompanied by a number of challenges faced by insurers in the previous period, especially when it comes to developing countries. This paper identifies the key challenges of digitalisation faced by insurance companies in Montenegro, such as: IT outsourcing, inconsistency of information programs and systems, etc., but it also proposes concrete measures to improve the operations of these companies, especially in terms of introducing technological innovations in financial reporting.

Keywords: *, insurance, digitalisation, Montenegro, financial reporting*

PRE-PROCESSING PIPELINE FOR PREPARING NON-ENGLISH TEXT DATA FOR COMPUTATIONAL ANALYSIS

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ABSTRACT:

In general, textual data cannot be directly fed to machine learning algorithms. It must be cleaned and transformed to numeric vectors for further analytics tasks. Text preparation is extremely important for computational text analysis but it can vary based on the grammar of a language and orthography. In this paper we propose reusable and customized pipeline to qualitatively pre-process user posts from one Montenegrin news portal. Experiments showed that the proposed method could be successfully applied to classifying user posts and significantly improve classifier accuracy.

Keywords: *text pre-processing, text classification*

CHALLENGES OF MANAGERS IN THE AGE OF DIGITALIZATION DURING THE COVID-19 PANDEMIC

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ABSTRACT:

The digital transformation of companies, industries and societies is advancing at an ever-increasing rate. Digital transformation refers to the integration, use and exploitation of digital technologies to drive major changes in the creation, appropriation and delivery of value. There have been many studies over the past decade that becoming increasingly digital is an imperative for companies to remain resilient and do business in the future. Digitalization has significantly changed the current managerial approach to business, improved it, but also brought with it new challenges caused by the global pandemic of the Covid-19 virus. The aim of this paper is to show how managers coped with the challenges during the Covid-19 virus pandemic. The paper starts from general theoretical considerations related to the changes that managers encountered in the demanding age of digitalization. Also, an empirical research was conducted, which included companies from the Republic of Serbia. For these purposes, scientific-research methods of analysis and synthesis, induction and deduction, as well as descriptive-analytical method were used. The presented data indicate that managers, with good management of digital tools, managed to repair the damage caused to the business caused by the pandemic relatively quickly.

Keywords: *manager, digitalization, Covid-19*

GROSS DOMESTIC PRODUCT IN THE HINTERLAND OF SEAPORT AS A BASIC PRECONDITION OF INTERMODAL ACTIVITIES IN THE SEAPORT CASE STUDY – SOUTHEAST EUROPE

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ABSTRACT:

The subject of this paper is the gross domestic product (GDP) in the hinterland of the main container ports in Southeast Europe and its impact on intermodal activities. GDP is the main precondition for greater foreign trade activities and consequently intermodal transport. The port itself should monitor the region's greater need for overseas trade in terms of infrastructure and superstructure equipment. The interest of shipping companies in a port is proportional to the economic development of the hinterland of seaport. The main goal of this paper is to present the importance of the region in which economic activities are carried out in the hinterland of the seaport for the port itself and the need to well connect the port with that region for larger activities in the port itself. GDP in the hinterland of the seaport, with which the port is well infrastructural connected, is the basic precondition and driver of larger intermodal activities in the port and consequently greater interest of shipping companies, this statement is a hypothesis that will be proven in this paper. The methods that will be used are analysis, synthesis, induction, deduction, generalization and concretization, as well as the method of comparison. The result of this paper aims to clearly present to managing structures of the port authorities, the main focus of their activities should be connection with the region that has a developed GDP.

Keywords: GDP, hinterland, Southeast Europe, intermodal transport, seaport

DEVELOPMENT OF THE CONVENTION AND EXHIBITION INDUSTRY IN RUSSIA: DIVERSIFICATION OF SERVICES

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ABSTRACT:

The article deals with international, exhibition, trade fair and congress activities in the Russian Federation. The resumption of exhibition activity in its full format shows itself as an effective mechanism for the recovery and further development of business, individual companies, industries and the economy as a whole, after the decline during the pandemic. The issues of diversification of services as the key to the successful development of the congress and exhibition industry of the country are touched upon. The important role of business education in the process of diversification as an important investment concept for the development of the Russian convention and exhibition industry was noted.

Keywords: *international, exhibition, fair and congress activities, development of business, economy, diversification of services, business education, investment concept*

DIGITAL TECHNOLOGIES IN TOURISM

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ABSTRACT:

The article considers various digital technologies actively used in the field of tourism. It can be online platforms for searching for accommodation, booking air and rail tickets, mobile applications of tourist guides, online booking of excursions, etc. I.e. the concept of digital tourism includes digital technologies that facilitate the preparation and planning of travel, help directly during the trip as well as after (for example, various photo services allowing to share photos with other travelers).

The article also analyzes the process of digitalization of the tourism industry, leading to an increase in its competitiveness. In addition, the article gives examples of the application of artificial intelligence technologies in the hotel industry, and provides a forecast of the development of the tourism industry in the post-covid period.

Keywords: *digitalization of tourism, artificial intelligence in tourism, chatbots, online travel platforms, travel services*

INTRA-INDUSTRY TRADE IN HIGH-TECHNOLOGY (TECH) PRODUCTS IN SERBIA

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ABSTRACT:

Intra-industrial trade (IIT) is the simultaneous export and import of similar products or services by one country. This model of trade is contrary to traditional theories of international trade and has occupied the attention of researchers since the 1960s. According to the Organization for Economic Co-operation and Development (OECD), high-tech products are defined as technical products whose production implies a high intensity of research and development. The paper will present data on the intensity of IIT between Serbia and its foreign trade partners from 2012 to 2020. The value of this index in the observed period ranged from 0.297 to 0.399. Also, the paper will present data on the exchange of high-tech products and the intensity of IIT between Serbia and the EU, CEFTA 2006, and Montenegro in the same period.

Keywords: *intra-industry trade, Grubel-Lloyd index, high-tech products*

THE INFLUENCE OF KNOWLEDGE, ABILITIES AND MOTIVATION OF HUMAN RESOURCES ON THE PERFORMANCE OF EMPLOYEES

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ABSTRACT:

This scientific paper deals with the concepts of knowledge, skills and motivation of human resources, as well as the impact of all the above on the work performance of employees in the company. The conducted research aims to show that knowledge, skills and personal motivation are the main prerequisites for a successful life and business and that knowledge, skills and motivation are key determinants of employee performance. The scientific goal of this research is to make a scientific description of the impact of knowledge, skills and motivation of employees on their work performance. Human resources, with their competencies and motivation, represent the total intellectual and psychological energy that is available to the company, and which can engage it in achieving goals and business development [4]. Providing quality people, motivating them, permanently educating and developing them so that they achieve high results and contribute to the achievement of organizational goals, becomes a key managerial task and function. This is, of course, a fundamental task of management at all levels, not just organizational units of human resources. Precisely because of the above, the research of organizational behaviour and employee satisfaction is of fundamental importance.

Keywords: *motivation, knowledge management, human resources management, work performance*

STUDENT PROJECTS AS A TOOL FOR IMPROVEMENT OF INNOVATIVE ENTREPRENEURSHIP OF STUDENTS OF ENGINEERING FACULTIES

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ABSTRACT:

Lack of support for improvement of innovative entrepreneurship of students is recognized as significant disadvantage in student's education at the Faculty of Mechanical Engineering of University of Montenegro. Therefore, a project application, focused to improving conditions for innovative entrepreneurship for students and academic staff, is prepared and submitted in frame of ERASMUS+ programme together with a few universities from the Western Balkans region, that also recognized the same problem with education of their students, and partner universities from Austria, Spain and Finland. After approval of the project entitled Reconnecting universities and enterprises to unleash regional innovation and entrepreneurial activity - KnowHub, its realization started two years ago. Meanwhile, necessary equipment was provided for hub of the Faculty of Mechanical Engineering entitled 3D Centar, which is meant to support improvement of innovative entrepreneurship of students and academic staff. Strategy of development, business plan and portfolio of services of 3D Centar were developed, its goals and activities were redefined in order to reflect basic intention of the project. Student projects, that have to be realized in cooperation with local companies were recognized in the project application as a tool for improvement of students's innovative entrepreneurship. In order to test such approach a realization of three student projects with local companies, which will be introduced in the paper, started a few months ago.

Keywords: *innovative entrepreneurship, student projects, KnowHub*

LEADERSHIP AND EMOTIONAL INTELLIGENCE IN THE FUNCTION OF IMPROVEMENT OF STRATEGIC POSITION OF ORGANIZATION

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ABSTRACT:

In the past, term successful organization had meaning of organization that had great financial capital at its disposal. However, modern manner of business operation brought up to popularization of the term emotional intelligence and to creation of “emotionally intelligent organizations” that perceive the key of their success in the area of human resources, through increase of emotional capital. In the 21st century, great leaders are those encouraging their employees. If we try to explain success of leader, we always talk about strategy, vision or about strong and great ideas. However, the essence of their success is something else – in the fact that great leaders trigger emotions. Today, leaders are emotional guides of their followers adorned with self-awareness, self-control, empathy and social skills. Leaders are persons leading us by their emotions. Crucial factor of success of an organization is quality communication resulting in mutual respect, trust and appreciation. In modern business conditions, whether lucrative or non-lucrative organizations, change is constant and success depends on team work which increases importance on interpersonal and emotional skills. To manage emotions and to stress resonant tones represent safe path to improvement of strategic position of organization.

Keywords: *leadership, emotional intelligence, strategic position, vision, mission.*

NON-PROFIT SECTOR AND PROACTIVE MANAGEMENT OF CHANGE

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ABSTRACT:

Non-profit sector represents an important segment of social and economic system with fantastic attractiveness of world phenomenon. Nowadays, in the world, processes of changes are taking place and their director, rhythm and intensity are unprecedentedly in the past. The whole world is moving in a megatrend characterized by liberalization, deregulation and strengthening market, mostly with one main aim – due to the increase of capital, i.e. profit. Thereby, it is an indisputable fact that there is an occurrence of strategic management. Practice of great and economically powerful countries strongly contests thesis that strategic management represent exclusivity of profit sector. Expansion of strategic management in non-profit sector is today decisive for the social upgrade to take the orientation towards its own status to be implied through non-profit sector. At the same time, one should have in mind that countries, due to reduction of budget expenses, in smaller extent directly finance non-profit sector and to greater extent giving such organization beneficial status, than direction to the different management represents great chance for strategic management as well. Strategic management represents inevitability for survival, growth and development of non-profit sector. Non-profit sector has to be able to follow new trends in business, to change and adapt. In order to achieve this, it has to apply proactive approach in management of changes. That would be good, quality and useful manner of management that would provide quality strategic position and position in internal and external environment to the non-profit sector.

Keywords: *strategy, position, proactive, management*

THE DIMENSION OF SERVICE QUALITY AND ITS IMPACT ON CUSTOMER SATISFACTION

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ABSTRACT:

The research was created as an attempt to discover the role of service quality in customer satisfaction. In particular, the research was asked whether based on the attitudes of users regarding the perceived services quality, their satisfaction can be predicted. Customer perceptions of service quality were measured using the dimensions of the SERVPERF model: responsiveness, tangible, empathy, reliability and security. Dimensions were used to examine the relationship between service quality and customer satisfaction. The research used a sample of 234 respondents, which included users who have used the services of shipping companies from Serbia in recent years. The regression analysis method was used to process the collected answers of the respondents. The results of the research confirm a significant positive correlation only between responsiveness and customer satisfaction. Other dimensions of service quality - reliability and tangible show medium, while security and empathy less significant positive correlation with customer satisfaction.

Keywords: *service quality, service quality dimensions, SERVPERF model, customer satisfaction*

THE POLICY OF MANAGING OF RAILWAYS IN BOSNIA AND HERZEGOVINA BETWEEN THE LEGISLATIVE, POLITICAL AND SOCIAL CONTEXT

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ABSTRACT:

This work gives a special and relatively systematic presentation of the situation in the railway system of Bosnia and Herzegovina, and points to numerous determinants that determine the organization and structure of the railway system in Bosnia and Herzegovina. The paper notes the many problems that have been burdening railways in Bosnia and Herzegovina, especially in the Federation of Bosnia and Herzegovina, for several years. In Bosnia and Herzegovina there are only two partially harmonized railway systems, the Federation of Bosnia and Herzegovina and Republika Srpska. Among them there is a significant normative, organizational and technical-technological incompatibility. The existing problems of railway operation can be grouped into three groups, the legal preconditions for the operation and functioning of the railways, the organization and issues of rail management, and the political and social context, all manifesting the material and technical preconditions for work. Workers specifically point to the need for ownership restructuring of the Federation Railways, their conversion into equity capital and at least partial privatization of the need for adequate financial investment in infrastructure to reach the desired level of modernization and grew into a respectable, modern and self-sustaining company. Large regional differences in infrastructure, traffic and power generation mean that some cantons and municipalities in the Federation of Bosnia and Herzegovina are not able to track railway traffic with their infrastructure. At the end of the paper, the authors find that a rooted strategic conceptual reform of the legal, organizational and financial preconditions for the work of the railway of the Federation of Bosnia and Herzegovina is needed and they make suggestions in that direction.

Keywords: *Legal assumptions of business, railways organization, finance*

OPPORTUNITIES PROVIDED BY THE THERAPEUTICAL POTENTIAL OF A TOURISM AS A TOOL TO SUSTAINABLE ECONOMIC & WELLBEING GROWTH

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ABSTRACT:

The article presents conceptual vision of a travel therapy terms and the tools that can enhance the development of the recreational areas.

The existing approaches to the understanding the health and recreational tourism basis & opportunities from both international and domestic professional sources are analysed. The therapeutic features of a tourism are defined as well as a various ways of its implementation & the effect. Development trends and the successful international examples of the related cases are outlined.

The work has been carried out to reveal subjects of the necessary additional research, to define activities that can bring a valuable economical results, boost travelers' & citizens' wellbeing, give a wider understanding of the therapeutic roots of a tourism and stimulate the regional development.

Keywords: *recreation, wellness tourism, travel therapy, therapeutic tourism, territory development*

THE CONSTITUTION OF THE REPUBLIC OF MACEDONIA ADOPTED IN 1991 AND THE SOCIO-ECONOMIC RELATIONS

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ABSTRACT:

In the constitutional history, the period from the end of the XVIII and the beginning of the XIX century is known as a period of the appearance of the written constitution. For the creators of the first written constitutions, the mechanisms for limiting the state power were a priority, while the regulation of the issues for the socioeconomic relations was of secondary importance. The introduction of provisions in the constitutions, organizing and regulating the socioeconomic relations in the country, is a relatively new phenomenon. The overthrow of the feudal socio-economic order, the proclamation of legal equality of the people and the possibility for everyone to acquire the right to private ownership, is reflected in the constitutional provisions defining ownership as individual and "sacred" right, and a right which is the basis for the development of society and the well-being of the individual.

The paper will analyse legal protection of the ownership as a fundamental value of the constitutional order. In this context the author will emphasize that, the Constitution of Republic of Macedonia adopted in 1991 establishes a completely new economic system which is based on two basic principles that represent the fundamental values of the constitutional order. These include legal protection of ownership and freedom of the market and entrepreneurship, as a completely new category of economic regulation. Freedom of the market and entrepreneurship is a principle on which economic systems are based, which are actually the antipode of the economy based on the planning of the state. Article 55 of the Constitution of 1991 guarantees freedom of the market and entrepreneurship. In addition, the Constitution provides for that the Republic is obliged to ensure equal legal position to all entities on the market. In this context, there is the constitutional provision according to which the Republic undertakes measures against the monopolistic position and the monopolistic behaviour on the market. The Constitution of 1991 provides for that the Republic encourages economic development and takes care of balanced spatial and regional development, as well as faster development of economically underdeveloped areas. Finally, the constitutional provision which guarantees the foreign investors the right to free export of the invested capital and the profit, is in the function of the development of the market economy and entrepreneurship. The rights acquired on the basis of the invested capital cannot be reduced by law or other regulation.

The paper will also analyse the National Bank of the Republic of North Macedonia as a constitutional category. In three constitutional provisions of Article 60, the Constitution

of 1991 sets out the grounds for regulating the subject for the National Bank, leaving space for it to be subject to more detailed regulation by law. Thus, the Constitution provides for that “the organization and work of the National Bank are regulated by law”.

Keywords: *constitution, ownership as constitutional value, constitutional foundations of economic relations.*

ELECTRONIC INVOICE SYSTEM IN THE FUNCTION OF MORE EFFICIENT FINANCIAL MANAGEMENT

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ABSTRACT:

With the introduction of the system of electronic invoices in the internal traffic of the Republic of Serbia from May 1, 2022, the public sector will have the obligation to issue and receive in mutual transactions, as well as private companies when issuing invoices to the public sector. According to the same dynamics of this national program of the Republic of Serbia, from July 1, 2022, the public sector will be obliged to issue eInvoices to private, and from January 1, 2023, the private sector will have to switch to eInvoices in mutual business that is, users of value added tax. The implementation of the activities of the national program for the introduction of electronic invoicing systems brings a big change for a large number of users of public funds as well as private companies that will no longer issue and receive invoices on paper. An electronic procedure for all of them will mean lower costs, less bureaucracy and faster payments, while the state will provide more efficient control over tax revenues and reduce the gray economy.

The introduction of electronic invoicing systems will contribute to the digitalization of business processes and more efficient functioning of financial management of companies that cooperate with a large number of external partners and exchange large amounts of documents, both with partners and within the company. The benefits of the introduction of eInvoice systems include increased control of posting in accounting systems, because the possibility of human error is significantly reduced. Business transactions are recorded without delay, which gives financial management a better basis for making business decisions.

Keywords: *electronic business, electronic invoices, financial management, digital transformation of companies*

DECISIONS IN CIVIL PROCEDURE IN THE FUNCTION OF THE EXECUTIVE TITLE

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ABSTRACT:

The Law on Civil Procedure of the Federation of Bosnia and Herzegovina ("Official Gazette of the Federation of Bosnia and Herzegovina", No. 73/05, 19/06 and 98/15; hereinafter: CAP) prescribes norms that define the procedure in which the content of the request that is being sued is decided. Ultimately, the decision resulting from the termination of a civil proceeding is an enforceable document within the meaning of Article 23 of the Law on Enforcement Procedure of the Federation of Bosnia and Herzegovina ("Official Gazette of the Federation of Bosnia and Herzegovina", No. 32/03, 52/03, 33 / 06, 39/06, 39/09, 35/12 and 46/16 (hereinafter: ZIP). This paper analyzes the legal effect of decisions in enforcement proceedings, which are the result of civil proceedings (judgments, decisions and court settlements), with an emphasis on court settlements. Therefore, the application of the enforcement procedure after the adoption of the mentioned court decisions is analyzed, ie the manner of realization of the rights determined by those decisions. Consequently, in the context in question, it is inevitable to mention the enforcement procedure, which in the function of legal regulation enables the implementation of these decisions.

Key words: *civil proceedings, enforcement proceedings, enforcement documents, court decisions*

INFLATION RATE IMPACT ON THE INVESTMENT RETURNS: A CASE STUDY OF REPUBLIC OF SRPSKA, BiH AND MONTENEGRO

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ABSTRACT:

Taking into account current trends in financial markets, the crisis caused by the COVID-19 virus, the research subject is analyzing, testing and quantifying the impact of inflation rates on the daily rates of return observed financial markets of Republika Srpska, BiH and Montenegro. The aim of the research is concrete, tested in practice and quantified knowledge about the possibilities and efficiency of the GARCH models in the application to quantify the impact of inflation rates on the rates of return of the observed financial markets. The period covered by the survey is from 2017 to 2021, where the width of the time horizon of the research allows testing the success of the GARCH methodology in the period before of the COVID-19 crisis, as well as during the crisis. In addition to the use of GARCH econometric models, the research methodology includes the use of AIC, SIC and HQC (Akaike, Schwarz and Hannan-Quinn) criteria for selecting optimal models to specific financial markets of developing countries. The results of the research confirm the role and importance of the application of econometric models to quantification the impact of the inflation rate on the investment activity returns on the observed financial markets. The obtained research results will be useful both to the academic community for further research in the field, and to the professional public in the context of making decisions on investment activities.

Keywords: *inflation rate, yield in financial markets, GARCH models, COVID-19 crisis, risk, investing.*

THE INTEGRATED RISK MANAGEMENT FRAMEWORK IN THE CLIMATE-SMART RESILIENCE CAPACITY BUILDING

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ABSTRACT:

As a result of urbanization, lightly regulated technological and ICT expansion, climate change has reached worrisome proportions. Carbon dioxide residues, radioactive contamination, biodiversity loss, topographical deterioration, environmental pollution, fossil fuel exploitation, and irreversible depletion of natural resources just seem to be a few of the factors why the ecological footprint is tending to provide an overarching counterargument to human-induced security risks. As socioeconomically disadvantaged countries lack critical infrastructures, knowledgeable decision-making processes, and coherent socioeconomic toolkits to manage and embrace climate change issues, the tendency becomes increasingly extreme in urban hazard and risk developing regions. Inadequate objection and resilience abilities as a major social problem, institutional inadequacies, and vital networks heighten vulnerability, compounding the size of the climate crisis's ramifications on communities and individuals. Traditional approaches to environmental risk management have focused on top-down assessments of climate hazards, which typically disregard the demands of people who are affected by climate change. Instead of the usual approach, smart-climate risk management should be more akin to a tailored kaleidoscope of network processes rather than merely the routine preservation of climate risks. Many important global agreements regarding climate change risk management underline the importance of systemic bottom-up methods and wide active participation of all societal actors in order to establish climate-smart resilience while simultaneously meeting socio-cultural and environmental well-being requirements.

Keywords: *urbanization, climate-smart, bottom-up approach, the Green Deal, environmental risk management*

DIGITAL LEADERSHIP

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ABSTRACT:

The aim of the study is to explore the dimensions of digital leadership. Meta –analysis method is used. The most important dimensions which are explored in different studies are explained. The interoperability of information complicates the duties of leader. Products, systems or business processes interact mutually. This facilitates the operations to personalize and customize products and services. Therefore, the role of the employees is rising. The home office working opportunities brings opportunities and challenges to the leaders. The motivation and management of employees is taken in a broad framework.

Keywords: digital, leadership

THE IMPACT OF THE COVID 19 PANDEMIC ON THE ECONOMY OF MONTENEGRO AND STRENGTHENING THE ROLE OF DECISION MAKERS (STATE)

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ABSTRACT:

The paper analyzes the business trends of companies in Montenegro during the COVID 19 pandemic and their reaction to the pandemic. All indicators available by relevant institutions were analyzed, as well as research previously done in this area. Also, one part of the paper analyzes the role of decision makers during the pandemic and the growth of their role and influence during the pandemic, which will be felt in the future. In addition, the paper provides an overview of the adopted policies and their implications for the Montenegrin economy with specific problems in implementing and monitoring of the economic effects. The paper gives concrete suggestions on how to regulate the business environment in order to support the economy in a sustainable way in terms of growth and development in crisis situations. In addition to this, the paper analyzes economic trends at the global level and gives a clear picture of how the COVID 19 pandemic, economically and regulatoryly, has changed most of the systems of all countries.

Keywords: *COVID19, economic policies, role of the state, subsidies*

SOME GENERALIZATION RESULTS ON STATISTICAL CURVATURE TENSOR

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ABSTRACT:

Statistical manifolds are new objects arising from the field of information geometry. They are manifolds of probability density functions. Lauritzen and Amari gave purely geometrical definition of these manifolds. Further, Kurose defined their complex version called holomorphic statistical manifolds. Besides the Levi-Civita connection, on statistical manifolds we have another connection ∇ which is obtained as a sum of the Levi-Civita one and a tensor K that satisfies certain properties. Curvature tensor, Ricci curvature tensor and shape operator are defined with respect to the statistical connection ∇ . In this paper we generalize some results from Riemannian geometry to geometry of statistical manifolds. In particular, we are interested in statistical curvature tensor which is constructed as a sum of curvature tensor R with respect to statistical connection ∇ and its dual curvature tensor R^ .*

Keywords: *statistical manifolds, curvature tensor, statistical connection.*

INFLUENCE OF CRISIS EVENTS ON THE BELGRADE STOCK EXCHANGE

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ABSTRACT:

At the beginning of the 20th century, various securities were traded on the Belgrade Stock Exchange. The most stable and most sought after were government securities. As expected, trust in the state was higher than in joint stock companies. At the moment, the Belgrade Stock Exchange has two indices. The leading index of the Belgrade Stock Exchange is BELEX15, which represents the movement of the most liquid Serbian shares. BELEXline is a general index of the Belgrade Stock Exchange that is calculated at the end of the trading day. The authors of this paper will conduct observations and research related to these two indices in crisis situations. In this paper, we investigated BELEX15 and BELEXline, before and after certain crisis events. The aim of this paper is to show the function of the stock market and its reaction in crisis situations. The results of examining these two stock exchange indices allow us to see the impact of the stock market on the transmission of instability in crisis situations.

Keywords: stock market, crisis events, stock exchange indices, crisis

IMPLEMENTATION OF METAL CUTTING TECHNOLOGY COURSE IN THE VIRTUAL WORLD SECOND LIFE

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ABSTRACT:

Virtual worlds are emerging technologies that could significantly change learning. One of the most prominent virtual world is Second Life. The paper describes possibility of using virtual world Second Life in Metal cutting technology course in order to overcome standard problems within laboratory exercises, such as lack of time to work with cutting tools. After classes at Second Life, students completed surveys whose goals and results are briefly described in the paper. Teaching realized in this way should increase the participation and motivation of students. The teacher's view on preparing and conducting classes in Second Life was also presented.

Keywords: *virtual world, Second Life, 3D model, Metal cutting technology*

DIGITAL MARKETING FOR SMES AND PROFESSIONALS BY USING LINKEDIN SOCIAL NETWORKS WITH INTEGRATED AI SOLUTIONS

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ABSTRACT:

This paper analyzes the utilization of social networks with integrated AI solutions (focused on LinkedIn) for the purpose of digital marketing, for SMEs as well as for professionals. Social networks can be applied by SMEs for: marketing, branding, business development, recruitment, and much more. Professionals can use LinkedIn for personal development, educational purposes, job searches, networking, buying or selling products or services, etc. Social networks increase visibility of both companies and professionals and have the potential to strengthen the image we want to present in public. Most social networks today utilize AI algorithms to: personalize the content for the user, increase the time spent on the platform, increase engagement and content creation, target potential buyers with the adds. Machine learning and deep learning technologies on social networks optimize, personalize and enhance user experience, and through different business models increase earnings for the social network companies.

Keywords: *digital marketing, artificial intelligence, social networks, LinkedIn, SMEs*

THE IMPACT OF THE COVID-19 PANDEMIC ON THE IMPROVEMENT OF TECHNOLOGICAL INNOVATIONS IN THE BANKING SECTOR

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ABSTRACT:

Contemporary market trends have had a great impact on the continuous changes in traditional relations between the entities that participate in it. Business conditions prevailing in the market impose a constant search for certain new principles and methods. The only way to overcome traditional logic is by advancing technological innovation. Banks have a serious task to prepare for the future now, given that the application of new technologies and innovations will play a crucial role. Under the influence of various factors, traditional banking goes through phases of changing the business philosophy, and noticing the needs and desires of clients. The subject of research of this paper includes the electronic transformation of the banking sector, as one of the important factors for the survival of the bank in a competitive environment. On the other hand, through the analysis of the results achieved on the basis of digital readiness of the bank in the conditions of the COVID-19 pandemic, this paper confirms the main hypothesis that digital transformation and technological readiness is a prerequisite for development and presence of the bank in the long run. The aim of this research is to point out the importance of monitoring technological innovations and their implementation in the banking system, based on relevant literature and available official data, and on the basis of which unpredictable risks can be reduced to a minimum in terms of ensuring smooth operation and profitability. The aim of this paper is to point out the transformed role of the bank 's functioning in the imposed pandemic conditions.

Keywords: digitalization, transformation, technology, banking.

INFLUENCE OF NARROW GROUP INTERESTS ON GENERATION OF ANTI-INSTITUTIONAL FACTORS IN SEE COUNTRIES

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ABSTRACT:

The failure of the transition in the SEE countries is undoubtedly the result of the implementation of a "reform" policy with double standards. Under the rhetorical neoliberal mask of market, competition, entrepreneurship and freedom, the policy and strategy of the "reformers" was directed towards non-market processes, motivated exclusively by individual interests, instead of propagated social and economic results. The subject of research in this paper is the connection between quasi-neoliberal theorists and quasi-neoliberal economic policy in a relatively vacuumed social environment (sociocultural capital) and the situation of long-term crisis character which enabled the formation and strengthening of quasi-institutional system (order) and its dominance over institutional system. The aim of the research is to prove the effect of the system of alternative institutions, which was particularly striking in numerous examples of predatory privatization, which has not yet been completed in most of the CEE6 Balkan countries.

Keywords: *transition, quasi-neoliberal economic policy, institutional system, alternative institutions*

PROJECT CONCEPT AND BUDGET

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ABSTRACT:

The European Union, as the largest donor, has invested over 610 million in grants in our country, and this paper analyzes the importance of proper conception and project budgeting. The importance of drafting a good concept is pointed out, because it is the first point of contact of the one who evaluates the project proposal, and based on it, to a large extent, forms an opinion about it. A good concept is a prerequisite for a successful project, its implementation and sustainability. We also analyze that the basis for a good budget is obtained after collecting data on the prices of products or services that we plan to use during the project implementation. This is particularly important given that unrealistic costing is one of the leading reasons for rejecting project proposals. In the final part of the paper, we explain why we should be guided by the idea that long-term and successful donor relationships are based solely on truthfulness and trust, and that losing trust means losing reputation, which no serious applicant wants.

Keywords: *project, analysis, concept, design, budget*

THE 2008 FINANCIAL CRISIS IN THE UNITED STATES, CAUSES AND CONCLUSIONS

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ABSTRACT:

The current changes in the global banking business are conditioned by the deregulation of financial markets in the previous period, economic crises and pandemics, accelerated movement of money and the application of new information technologies in banking. Previous deregulation of the market and unethical operations of investment banks in the United States led to the 2008 financial crisis, which spread globally. This paper focuses on the roots and causes of this crisis, findings and conclusions in order to overcome future economic crises caused by banking. The purpose of this paper is to find a common meaning or key cause of this and similar economic crises.

Keywords: *banking, financial crisis, ethical norms, moral business, investment banks*

***SUSTAINABLE DEVELOPMENT,
ENERGY EFFICIENCY AND
RENEWABLE ENERGY SOURCES***

ENERGY PRODUCTION FROM SOLID WASTE

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ABSTRACT:

Recent turmoil in the energy market has (re)opened some old and new questions about how to achieve energetic sustainability and independence on national level. Although there is a consensus among academics and policy makers about reduction of application of mineral raw materials, due to the new circumstances this is now being reconsidered, and coal-fired thermal power plants are being re-introduced by extending their service life, and special emphasis is placed on the energy needs from nuclear power plants. In this paper we will try to find an answer to the question how to proceed with these developments? Renewable energy sources are definitely one of the answers. However, the use of solid waste has somehow so far been sidelined from a number of aspects of the application of this very potential energy source. Waste is one of the biggest problems of today, consequently we need to invest considerably more effort, time and money in waste management systems. In this paper we will examine the possibilities and potentials of solid waste for energy production, especially in Bosnia and Herzegovina.

Keywords: *new energy, renewable energy sources, pollution, solid waste, solid waste management, sustainable development*

ENERGY REHABILITATION OF ADMINISTRATIVE BUILDING IN THE PROCESS OF ENERGY OPTIMIZATION

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ABSTRACT:

This paper aims to examine the possibilities of energy rehabilitation of the city administration building in Novi Pazar with the aim of reducing transmission losses through the building envelope. Namely, the western façade of the building, which is at the same time the entrance façade, faces the main road and the square and defines the identity of the building. The characteristics of the western façade are a large percentage of transparent surfaces, followed by the materialization of the stone and plastered façade. The paper examines the possibilities of improving the energy characteristics of the western facade of the building with the use of classical interventions of energy rehabilitation of the building and the use of double skin facade, as a modality of passive solar architecture and modern expression of architectural design of office buildings. The evaluation of the improved characteristics was performed on the basis of the values of the heat transfer coefficients for specific scenarios of energy rehabilitation of the building.

Keywords: *energy rehabilitation, sustainable development, double skin facade, transmission losses*

SUSTAINABLE PATTERNS IN VERNACULAR BUILDING

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ABSTRACT:

Vernacular building carries patterns that reveal strategies in its efforts to be environmentally sustainable. Contemporary architectural vocabularies can also achieve this effect as vernacular did it. Only after applying all the possibilities for passive methods of creating comfort that offer environment, it is possible to switch active ways of achieving comfort by using high-tech devices and mechanical support. If there is a way to enable comfort with orientation, form, design and materialisation, as in vernacular example, then it should recognize, accept and apply. Although today high technology can achieve comfort in whatever climate area, the designer however should not rely on mechanical devices, and ignore the climate sensitive forms from vernacular architecture.

Keywords: vernacular building, comfort, sustainable patterns, environment

PROMOTION OF ORGANIC AGRICULTURE FOR SUSTAINABLE RURAL DEVELOPMENT

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ABSTRACT:

Organic farming contributes to the preservation of the natural environment, natural biodiversity and creates additional jobs in rural areas. The Federal Law on Organic Agriculture in Russia came into force on January 1, 2020. At the institute, field research on organic agriculture has been carried out on an experimental field since 2014. Since 2016, an experimental crop rotation has been implemented, including fields with potatoes, beetroot and perennial grasses. The crop rotation soil is highly fertile with an organic matter content of about 8%. Field crops are cultivated using a biologized technology developed at the institute. The experiments used compost prepared from chicken manure in a biofermenter, and biological products for plant protection. To obtain information on the ecological state and condition of plants, the following are used: an automatic weather station, soil temperature and water content sensors, unmanned aerial vehicles and the selection of soil and plant samples for analysis in the laboratory. The obtained productivity of agricultural crops is quite high, not inferior to the average statistical data on productivity in the region. The information received is passed on to farmers who want to switch to organic production.

Keywords: *organic agriculture, field experiment, crop rotation, agricultural crops, yield, soil analyses*

BIOETHANOL PRODUCTION FROM WHEAT STARCH MILK CONTAINING B-TYPE GRANULES

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ABSTRACT:

*Bioethanol is nowadays one of the most prospective renewable alternatives for the replacement of fossil fuels. Also, worldwide bioethanol is widely used as a disinfectant, solvent, and significant raw material in alcoholic beverage, food, chemical, pharmaceutical industries. This work aims to investigate the potential of wheat starch milk, produced by wheat processing in the industrial starch production process, as a substrate for bioethanol production. An enzymatically hydrolyzed wheat starch milk containing B-type starch granules was used for batch ethanol fermentation by *Saccharomyces cerevisiae*. Based on obtained fermentation parameters, it was found that investigated wheat starch milk is an excellent raw material for bioethanol production providing ethanol yield of 76 mL/L, high ethanol yield per suspension dry matter of 0,6 L/kg, and high starch utilization for ethanol production of 96,3%. Besides, in comparison to conventionally used wheat grain, the use of wheat starch milk as a raw material for bioethanol production can provide significant savings in energy for mechanical preparation of grains and process water during substrate preparation, and also cost savings in wastewater treatment. The authors acknowledge the financial support of the program 451-03-68/2022-14/200134 by the Ministry of Science and Technological Development of the Republic of Serbia.*

Keywords: *bioethanol, starch, wheat, hydrolysis, fermentation*

ENERGY EFFICIENCY ANALYSIS OF SOLAR POWERED SHIP - THE CASE OF BAY OF KOTOR

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ABSTRACT:

Because the usage of renewable energy sources is constantly increasing, there have been numerous studies related to their use in various fields. Although maritime transportation contributes to the release of harmful gases into the atmosphere, integrating renewable energy sources, particularly solar energy, into the ship's power system presents an environmentally friendly approach. The application of photovoltaic systems for generating electricity in the maritime industry is also important due to the high potential of solar radiation in maritime areas. The paper presents an analysis of the use of solar energy for a tourist ship's power system while cruising the Boko-Kotor Bay, using PVsyst software. Various parameters, such as the location of the ship, the type of module and inverter, the module inclination angle, and the azimuth orientation angle, were used in the research. Based on the obtained results, an analysis of the energy efficiency and economic profitability of using a photovoltaic power generation system on the ship was performed. The results showed that the proposed photovoltaic system is technically and economically feasible.

Keywords: *energy efficiency, photovoltaic, PVsyst softwer, ship*

THE IMPACT OF RENEWABLE ENERGY AND ECONOMIC GROWTH ON CO₂ EMISSIONS IN THE EU

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ABSTRACT:

In this study, effects of renewable energy and economic growth on CO₂ emissions are being examined, short and long term, by using the example of EU countries. Time span of observing variables is limited to the period 1980-2018. ARDL modeling was used as corresponding methodological frame. The results have shown that the co-integration between variables was established in analyzed countries. In the long run, economic growth causes the increase of CO₂ emissions, while renewable energy sources decrease CO₂ emissions. Observed in the short run, the results are divergent. In most cases, renewable energy sources cause the decrease of CO₂ emission, while the economic growth do not have clear impact on emissions. In that sense, the focus of attention should be on insisting on clearer technologies of growth, more efficient use of energy sources as well as the availability of energy sources that do not have harmful impacts.

Keywords: *renewable energy, CO₂ emissions, co-integration, EU*

POTENTIAL ECOLOGICAL AND HEALTH RISK ASSESMENT IN SOIL NEAR THE MINE OF LEAD AND ZINC IN PLJEVLJA MUNICIPALITY (MONTENEGRO)

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ABSTRACT

Ecological and health risk assesemnt associated to heavy metal content in agricultural soils and collected near the mine of lead and zinc mine located in Pljevlja municipality (Montenegro). Ecological risk of soil was estimated using the index of geo-accumulation, (Igeo). Non-carcinogenic and carcinogenic health risk was evaluated through different soil exposure pathways (ingestion, inhalation and dermal contact). The results indicated the polluted agricultural soil in investigated area. The pollution indice, Igeo, indicated the ecological risk with respect to the soil pollution by Pb, Zn, Cd and Cu. A serious health non-carcinogenic and carcinogenic risks were identified for adults through the soil exposure. Ingestion was identified as the main contributor to carcinogenic risk while dermal contact present the main exposure pathway for non-carcinogenic risk.

Keywords: Heavy metals, Agricultural soil, ecological risk, health risk

INVESTIGATION OF THE EFFECT OF THE FRICTION GEOMODIFIER ON THE PERFORMANCE OF TRIBO- CONJUGATIONS

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ABSTRACT:

The article is devoted to geomodifiers of friction based on serpentinite as an additive to the lubricating medium. The process of influence on friction and performance indicators of tribo-conjugations in machine mechanisms is considered. The article presents the results of research on the use of serpentinite-based friction geomodifiers at the stage of finishing antifriction treatment of the friction surface of parts to improve the performance of tribo-tension on the example of a restored crankshaft. The influence of the finishing antifriction treatment mode on the roughness parameters was determined on the basis of multifactorial experiments. As a result of the study, the functional dependences of the roughness parameters on the pressure and the speed of movement of the indenter were obtained, and the dependence of the bearing capacity of the coupling and the wear of the roller-pad coupling on the pressure of the indenter and the multiplicity of the application of force during processing was determined.

Keywords: *antifriction material, geomodifiers of friction, finishing antifriction treatment, coefficient of friction, surface roughness, reduction of mechanical losses, tribo-tension, operability, wear resistance*

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