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COAST
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II INTERNATIONAL CONFERENCE ON ADVANCES IN SCIENCE AND TECHNOLOGY

BOOK OF ABSTRACTS

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31 MAY - 03 JUNE 2023

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NOTE:

The authors have full responsibility for the originality and content of their own papers.

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RATIONALIZATION OF ILLUMINATION UNIFORMITY FOR LED LIGHT FITTING AT THE WORKPLACE USING THE DIGITAL SOFTWARE SOLUTION

Darina Dupláková[1], Ján Duplák[1], Dejan Kojić[2], Enes Sukić[3]
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ABSTRACT:
Rationalization is a set of complex activities, which are supposed to ensure the most advantageous arrangement of the work process with the continuity of increasing the level of technique, technology, work organization, production, and management. The goal of rationalization in the production area is to increase the effectiveness of the work procedure, product, or work environment, based on rationalization measures in partial steps of the implemented activities. In order to achieve efficient production, it is not only important to properly implement machines, tools, materials, technologies, and positions, but also to ensure suitable working conditions. It is necessary to constantly monitor, analyze and ensure their improvement at all levels of production. The correct setting of working conditions (elimination of noise, elimination of dust, lighting and technical conditions, etc.) leads not only to well-being at the workplace but also to the reduction of error rates, the growth of economic efficiency, and the continuity of the production process. The presented article is focused on a comprehensive assessment of uniformity in the workplace with the subsequent presentation of a rationalization solution for its improvement using specialized digital technologies. The conclusion provides a comprehensive summary of the obtained results and describes the possibilities of further solving the problem. This research was supported by grants VEGA 1/0431/21 and KEGA 028TUKE-4/2021.

Keywords: *uniformity, digital ergonomics, rationalization, lighting*

CLASSIFICATION OF DIGITAL OBJECTS BASED ON TOPOLOGICAL AND GEOMETRIC METHODS

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ABSTRACT:
We propose a method to classify shapes stemming from various problems in industry, medicine and applied sciences, by combining approaches from digital image processing, topology and machine learning. After initially preprocessing the images (in order to decrease the contrast and illumination differences), we binarize the images using increasing threshold values. We form the corresponding filtration and compute its persistent diagram, from which we derive several topological object descriptors (acting as classifiers). Besides topological, we also calculate some geometric classifiers, pertaining mostly to area, perimeter and elongation. For each value, topological and geometric, we discuss its applicability, and compare new classifiers with existing ones.

Keywords: *classification, shape analysis, image processing*

COMPARATIVE ANALYSIS OF THE IMPLEMENTATION OF BASE TECHNOLOGIES INDUSTRY 4.0 IN USA, JAPAN, REPUBLIC OF KOREA, GERMANY WITH CHINA

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ABSTRACT:

In recent years, major changes have taken place thanks to the implementation of the basic technologies of Industry 4.0. The concept itself is not widespread enough in production processes in the industry, but changes are still taking place, reshaping production systems, consumption, delivery, logistics, as well as in all segments of production processes. Changes are happening thanks to innovations in basic technologies such as: flexible automation, robotics, 3D printing, Internet of Things (IoT), smart sensors, big data (Big Data), cloud computing (Cloud Computing), radio frequency identification (RFID), virtual and augmented reality (AR), artificial intelligence (AI), etc. The paper presents a comparative analysis of the global trend of international patent families (IPF) in the basic technologies of Industry 4.0. The basic technology of Industry 4.0 robotics was taken into a detailed analysis, so that the implementation of robots in the most developed countries in the world, i.e. in the countries: USA, Japan, was analyzed. , Republic of Korea, Germany and their comparison with the implementation of robotic technology in China. An analysis of the trend of the implementation of the basic technology of Industry 4.0: robotics in China, as well as the reasons for such trends. In order for companies to be competitive on the global world market, it is necessary to start the implementation of the basic technologies of Industry 4.0 as soon as possible, and in the first place robotic technologies.

Keywords*: flexible automation, robotics, robot, Industry 4.0, production process.*

ROBOTICS AS THE BASIC TECHNOLOGY OF INDUSTRY 4.0

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ABSTRACT:
All companies in the world face global competition, and in order to keep up with the competition and meet increasing demands on the market, it is necessary to use new technologies in production processes, i.e. implement Industry 4.0, in other words, through digital transformation, make a connected company that enables production processes to discover new ways to increase productivity and improve overall business performance. When we have access to production data in the production process at any moment in real time, it allows us to monitor and improve the performance of the production process itself, and this is made possible by the implementation of the basic technologies of Industry 4.0. The term Industry 4.0 is already widely used, and it is related to various production concepts. From a technological perspective, Industry 4.0 should be understood as the increasing digitization and automation of production processes, that is, the production environment and the design of the digital value chain from the product to the customer. Some authors call Industry 4.0 a new disruptive technology, and it is inevitable because the world today is in the light of a dynamic era, and it changes the very way of production processes that are currently implemented in most companies. The concept of Industry 4.0 is defined by many technologies (over 40 technologies), a few are given here that are basic: robotics, automation, Internet of Things (IoT), big data, cloud computing, 3D printing, smart sensors, radio frequency identification (RFID), virtual and augmented reality (AR), artificial intelligence (AI), advanced security systems, Cyber-Physical Systems (CPS), etc. The aforementioned technologies are combined to construct dynamic, real-time optimized and self-organizing value networks between production processes and companies, and all listed components are necessary for the implementation of Industry 4.0. By implementing the underlying technologies, we optimize; equipment in the production process so that we have greater safety, improved problem solving, safety of equipment operation, and better maintenance, production itself so that we improve the use of resources, to have proactive diagnostics, machines for cooperation and management, and get lower total costs.The goal of implementing the basic technologies of Industry 4.0 is smart production in which we have operational information in real time, reduce risk in the supply chain, reduce inventories and achieve efficient production. For survival and presence on the global market, it is necessary for companies to optimize equipment, which must be reliable and safe, minimize equipment downtime and improve problem solving. One of the basic technologies of Industry 4.0 is robotic technology, by implementing rigid automation we turn it into flexible, increasing the performance of the production process. Through the research and development of robotic technology, we have reached a time when industrial robots of the second generation are being introduced into production

processes, which have a number of advantages compared to industrial robots of the first generation. Here are some of the advantages of industrial robots of the second generation compared to industrial robots of the first generation:

- *industrial robots of the second generation are characterized by ease of handling,*
- *by using industrial robots of the second generation, we are able to improve performance when performing operations between robots and workers,*
- *the work of the robot and the worker takes place in the workspace together, and the worker is sure that he will not be injured,*
- *we are able to create various levels of automation with industrial robots of the second generation, which means that we can partially automate tasks in those cases when complete automation is too complex or not economical,*
- *today, the reduction of the product life cycle and the increase in the variety of products require the flexibility of automation, which will result in an increase in the use of industrial robots of the second generation,*
- *industrial robots of the second generation will be able to be implemented by small and medium-sized companies, for two reasons, the first is that the price is acceptable (very low compared to the industrial robots of the first generation), and the second is that the implementation is simplified, no highly educated personnel are needed,*
- *non-ergonomic workstations can be significantly improved using industrial robots of the second generation, where we must remember that worker safety is an absolute prerequisite,*
- *industrial robots of the second generation have the most significant role in Industry 4.0, which connects the factory of real life with virtual reality, which opens future perspectives in global production.*

When implementing robotic technology, companies have the following motives: reducing operating costs, reducing capital costs, improving product quality and consistency, improving the quality of work, respecting health and safety rules, increasing production rates, increasing flexibility in product production, saving space, etc. It is to be expected that in the future the trend of applying robotic technology will be growing. It is known that Industry 4.0 is being implemented in world companies that are leading of the global market, so that in the coming years the trend of implementing robotic technology in all industries will continuously increase. To the extent that companies want to be competitive on the global market, they must implement Industry 4.0 in production processes, and they can only achieve this by implementing the basic technologies of Industry 4.0, and one of the main technologies for automating production processes is robotic technology, i.e. industrial and service robots.

***Keywords**: robotic technology, patents, industrial robot, service robot, industry 4.0, production process, automation.*

DEVELOPMENT OF PROGRAMS FOR ADMINISTRATION OF WORK ORDERS IN WIRE PRODUCTION

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ABSTRACT:
The paper describes the development of software support for the administration of work orders in wire production, which will contribute to the improvement of business activities within the company. The goal of the work is to make the process transparent and easier to follow for the employees of the company "Yazaki" who work on the production of wires. By developing this program, employees will be able to monitor the wire production process, administer machines and work orders for available workers. The work is grouped into several parts. The first part of the work describes the company for which the program support is intended. After that, an overview of defined tables and procedures is given. The paper describes the functionality and features of the program.

Keywords: *account administration, wire production tracking*

THE SPECTACLE IN (PHYSICAL) SPACE: ARCHITECTURE AS A SPECTACLE – SENDAI MEDIATHEQUE AND KANAGAWA INSTITUTE OF TECHNOLOGY

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ABSTRACT:
Thinking about the role of architecture in everyday life, by changing the meaning of the space without any physical intervention to the space itself or the elements that define the space, we can talk about the fact that architecture in its existence represents an event. Assuming that every event is a spectacle, the way of consumption of space and informations in physical space, i.e. the experience of that space or form of architecture is a spectacle. The spectacle phenomenon has been on-going for many years, and talking about architecture as a spectacle is the main topic of this paper. This paper aim to present and discuss two objects that deviate from the expected patterns of planning and building, namely Sendai Media Center by Toyo Ito and Kanagawa Institute of Technology by Junya Ishigami. These objects will be observed as a place of spectacle, that is, as a spectacle in physical space.

Keywords: *space, spectacle, architecture, sendai mediatheque, kanagawa institute of technology*

DESIGN OF FLOUR SEMI-FINISHED PRODUCTS TECHNOLOGY FOR HEALTH NUTRITION

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ABSTRACT:
The technological aspects of using the commercial batch brown algae Fucus (Fucus L.), riched in macro- and microelements, in the technology of flour products, to expand the range and increase the nutritional value of finished products. As objects of research, there were selected Fucus powder, choux pastry and baked semi-finished product basis on it. On the basis of the experiments there were developed a recipe and technology of custard semi-finished product with fucus. It has been found that replacing 7 % flour with fucus powder in the recipe does not make worse the technological properties of the dough and finished products (moisture, heat loss, and dampness). Analysis of organoleptic characteristics showed that it is advisable to use fucus to develop new recipes for flour products used as edible containers for portioning and serving cold snacks, including choux pastry. The peculiar smell of Fucus goes well with the aroma of fish and seafood. Fucus has a positive effect on the nutritional value of the samples. Their energy value decreased by 2 %, and such nutrients as vitamin C and iodine appeared in the composition, the content of sodium, potassium, magnesium, vitamin A increased. Studies have shown relatively high functional and technological properties of Fucus powder, which, in combination with increased nutritional value provides multivariate use of this additive in innovative technological developments. On the basis of an experimental recipe for a custard semi-finished product, an assortment of buffet cold snacks and a set of regulatory documents have been developed.

Keywords: *health nutrition, choux pastry, Fucus powder*

THE CONTEMPORARY FUNCTION OF THE BROWNFIELD-CASE ANALYSIS OF THE MUSIC SCHOOL IN NOVI PAZAR

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ABSTRACT:
Idealized architectural-urbanistic town politics implies the constant coherency of its urbanistic tissue and the activities undertaken within urbanistic tissue. Non-functionality of the area or building prevents urban tissue development, but, at the same time, urban tissue consists of the older buildings, which, even neglected, are present-time gatekeepers. Neglected and unutilized areas, within the international professional domain called brownfields, during past decades are successfully reanimated as they were reactivated - revived with new contents and repurposed for new functions and uses. The subject of this paper is the building of the Music School "Stevan Mokranjac" in Novi Pazar, i.e. the potential of the building's attic for reactivation and reshaping of the space for contemporary function. The aim of the study is to portray the importance of heritage, its authenticity, and its value so that future efforts for similar reactivations of particular objects in Novi Pazar could be promoted. Awakening consciousness and drawing the attention of the broad public to the existence of the objects as well as their valuing and protection presents one of the important turning points during the incitement of the town's cultural development. The concept of solution finds inspiration within the "free plan" concept of the pavilion by Mies van der Rohe
.

Keywords: *brownfields, reactivations, cultural heritage*

CONTEMPORARY DEVELOPMENT OF AN ECOFRIENDLY PRODUCT

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ABSTRACT:
The main challenge in the development of modern products is the numerous demands of customers and the market, but also challenges caused by the energy crisis, limited use of resources, as well as the consequences of other pandemics caused by the Covid-19 virus. Contemporary production responds to these challenges by using digital tools and strategies in all phases of the product life cycle, while being guided by the principles of sustainable development. This paper will show the importance of the use of engineering tools in the product development process in order to obtain a competitive product on the market suitable not only from the aspect of technological and economic requirements, but also as an environmentally friendly product. In this way, the paper will point out the importance of digital transformation and the development of digital skills in achieving the goals of the green agenda, which are realized by applying smart production in Industry 4.0.

Keywords: *Product development, Ecodesign, Product life cycle analysis, Software tools.*

INFLUENCE OF EXTRACTION METHODS ON THE RECOVERY OF PHENOLIC COMPOUNDS FROM DALMATIAN SAGE POSTDISTILLATION WASTE MATERIAL

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ABSTRACT:
Salvia officinalis L. (Dalmatian sage) is a perennial hardy subshrub that came originally from the area around Mediterranean. The essential oil of Dalmatian sage leaves contains various bioactive compounds such as terpenoids, steroids, flavonoids and polyphenols. Hydrodistillation, due to its low cost and simplicity, continue to be the primary technology for essential oil isolation. However, various postdistillation by-products, including spent plant materials, aqueous condensates and distillation wastewaters are generated in large amounts. Usually, these by-products are considered wastes and discarded in the environment without further processing.
The extraction of pharmacologically active molecules, such as phenolic compounds, provides a novel method of valorizing such waste materials. Phenolic compounds are defense agents that counteract biotic and abiotic stresses, scavenge reactive oxygen and nitrogen species (RONS), chelate pro-oxidant metals and regenerate antioxidants.
The main objective of our investigation was to examine the influence of different extraction methods on the recovery of bioactive phenolic compound from sage postdistillation leaves waste material.
The extraction process was performed by conventional methods and ultrasound assisted method. Analyses of total phenolic content (TPC), total flavonoid content (TFC) and antioxidant capacity (via 1,1-diphenyl-2-picrylhydrazyl (DPPH) assays) in obtained extracts were done.
The comparison of extraction methods showed that ultrasound extract contained the greatest amount of total phenols and flavonoids as well as the greatest antioxidant activity. According to the obtained results, postdistillation waste of Dalmatian sage leaves could be used as a source of biologically active phenolic compounds.

Keywords: *Dalmatian sage, postdistillation waste, polyphenols, antioxidative activity.*

ANALYSIS OF VARIANT SOLUTIONS OF THE PEDESTRIAN TIMBER BRIDGE

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ABSTRACT:
The paper analyzes three variant solutions of a pedestrian wooden bridge with a span of 90m and a useful width of 4m. For each variant solution, a load analysis, static calculation, dimensioning and preliminary measurement and calculation of basic materials were made. In addition to the aforementioned analyzes and calculations, when evaluating the observed models, other criteria were also taken into account, such as aesthetics, maintenance, the way the bridge was constructed... Since all criteria are not equally important, the selection of the optimal solution was made based on the method of multi-criteria analysis, using weighting coefficients (weighting). The adopted model was further examined for dynamic behavior due to the movement of pedestrians, because it is one of the critical loads of the pedestrian bridge, all with the aim of forming as complete a picture of the required characteristics of the adopted variant solution as possible. At the end, through a comprehensive analysis, we come to the conclusion that one version of the solution stands out from the others and that it is the most suitable for the further stages of project development. The presented analysis can also be applied to similar projects of adopting multiple variant solutions.

Keywords: *timber pedestrian bridge, multi-criteria analysis, weight coefficients, vibrations of the pedestrian bridge*

USE OF OIL RESIDUES FROM OILSEEDS PROCESSING IN FUNGAL PROTEOLYTIC ENZYMES PRODUCTION

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ABSTRACT:
Cold-pressed oils from various oilseeds have become very popular at global food market lately, due to its high quality and beneficial effects on human health. Oilseeds are widely grown in Vojvodina Province and further processed by regional enterprises causing significant amounts of effluents with no adequate method for its utilization. Production of industrial microbial enzymes might be a promising solution for sustainable valorisation of these effluents. Advanced developments in detergent industry require greener technology and cost-effective production and one of potential alternatives is the utilization of microbial enzymes. Proteolytic enzymes have found a very significant role in detergent industry for cleaning purposes. The aim of this study was to examine the possibility of proteolytic enzymes production by cultivation of reference strain Trichoderma ressei QM 9414 and wild-type isolate of Trichoderma sp. on medium containing oil residue from sunflower, pumpkin seed and soybean processing. The success of the bioprocess was estimated based on the proteolytic activity of enzymes in raw enzyme preparations in the temperature conditions of detergent application, i.e. at 30°C and 60°C. According to the obtained results maximal proteolytic activity of enzymes at 30°C was achieved when reference strain Trichoderma ressei QM 9414 was cultivated in medium with oil residues from soybean processing and at 60°C when Trichoderma sp. isolate was cultivated in medium containing oil residues from pumpkin seed processing. The results obtained in this study represent valuable information for future investigations related to the utilization of oil residue through the production of value-added products.
Keywords: *biotechnological production, cold-pressed oil residue, fungal enzymes, proteolytic activity, Trichoderma*

ACKNOWLEDGEMENT

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ANALYSIS OF THE IMPACT OF INDUSTRY 4.0 TECHNOLOGIES ON OCCUPATIONAL SAFETY AND HEALTH

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ABSTRACT:
The development of technologies intended for the digitalization of activities in industry and their implementation into manufacturing process imply changes that affect access to activities related to the occupational safety and health.
The paper analyzes the impact of Industry 4.0 technologies on occupational safety and health. The analysis was realized from the perspective of employees, employers and the appropriate legal framework. The impact on employees was analyzed through the potential hazards that employees may be exposed during the use of these technologies. The impact on employers was analyzed through the need for changes in work organization during the implementation of Industry 4.0 technologies in existing production systems. The legal framework was observed through the need for changes and additions to requirements related to the safety and health of employees who handle machines and devices.
In accordance with the previous, the paper presents potential improvements and problems that experts in the field of occupational safety and health may encounter when analyzing the impact, control and prevention of risks to the safety and health of employees in systems where Industry 4.0 technologies are implemented.

Keywords: *Industry 4.0, Industry Internet of Things, Occupational Safety and Health*

CONTEMPORARY PROTECTIVE COMPONENTS AND METHODS OF TESTING LOW VOLTAGE ELECTRICAL INSTALLATIONS AS PREVENTIVE FIRE PROTECTION

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ABSTRACT:
The paper explains the failures of low-voltage electrical installations, which most often cause fires in buildings. Depending on the degree of danger of causing a fire, that is, the technical possibilities to detect the fault before it causes a fire, electrical faults are classified into categories. For the most dangerous faults, poor electrical contact and series electric arc, an overview of contemporary protective components that can be found on the market today is given. The principle of their work is also briefly explained. The valid European standards on the verification of the quality of low-voltage electrical installations are critically analyzed in terms of their application from the aspect of fire protection. Two contemporary methods for preventive detection of poor electrical contacts will be presented – thermal imaging of distribution cabinets and a recently developed new method based on electrical measurements with the use of a standard installation tester.

Keywords: *low-voltage electrical installations, electric arc detector, thermal imaging, poor electrical contact, installation tester*

APPLICATION OF ADDITIVE TECHNOLOGIES IN PRODUCT DEVELOPMENT PROCESS OF COOLER FOR RASPBERRY PI

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ABSTRACT:
This paper presents the process of developing a cooler for the Raspberry Pi 4 computer by application of additive technologies. First, based on real measurement 3D CAD geometric models of the parts of the cooler assembly were designed using SolidWorks software. After assembling, an analysis of the compliance of the parts was performed. In order to produce prototype of cooler, program G code was created and generated for certain prototyping machine. The parts are made using a 3D printing process and then assembled into an assembly. That assembly was mounted on Raspberry Pi 4 computer, and whole assembly was mounted into housing. A visual inspection of the assembly and a functional test showed that the design requirements were completed.

Keywords: *product development, 3D model, cooler, Raspberry Pi 4, additive technologies*

OSMOTIC TREATMENT OF NETTLE LEAVES (URTICA DIOICA) IN SUCROSE AND SODIUM CHLORIDE SOLUTION

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ABSTRACT:
Nettle (Urtica dioica) is often presented as one of the most valuable plants in the world. In addition to its characteristic property of burning and irritating the skin, all plant parts are medicinally beneficial. Furthermore, it contains numerous minerals (Fe, Mg, Zn, K, etc.) and vitamins (C, A, B2, B5, etc.). In order to maintain the physical, chemical, microbiological and antioxidant stability of nettle leaves, it is necessary to apply some form of preservation. The osmotic dehydration advantages are numerous: low operating temperature, removal of water in a technical form, improvement and maintenance of product quality factors, the possibility of reuse of the solution, shortened drying time, etc. This research is based on the osmotic treatment of nettle leaves in a solution of sucrose and sodium chloride. Pareto diagrams of the mineral content model during the osmotic treatment of nettle leaves in sucrose and sodium chloride solution are shown depending on the process's duration and the osmotic solution's temperature. The presented Pareto diagrams of the developed second-degree polynomial for the responses of Ca, Mg, Na, K, Fe, Zn, Mn and Co show the greatest influence of the linear terms t and T, statistically significant at the $p<0.01$ level or $p<0.05$, respectively. The low values of the parameters $\chi 2$, RMSE, MBE and MPE, as well as the high value of the coefficient of determination, indicate a reliable prediction of the presented minerals for the osmotic treatment of nettle leaves in a solution of sucrose in sodium chloride.

Keywords: *osmotic treatment, nettle leaf, Pareto diagram, regression coefficient, polynomial of the second degree*

POSSIBILITIES OF CONSTRUCTION IMPROVEMENT OF THE COMBINED VALVE FOR DISTRICT HEATING SYSTEMS

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ABSTRACT:
The paper presents the construction and characteristics of the combined valve used in district heating systems, as well as a proposal of its constraction improvement. In construction improvement of a combined valve, the task is to improve all the shortcomings and regulatory characteristics of that valve while maintaining the maximum declared flow for that valve. Special attention was paid to new parts and materials, sealing elements, regulatory features and valve housing during construction. Constructive improvements in the sealing of the combined valve enable the prevention of leakage on the seals, which will lead to an increase in operational safety and an extension of the service life of the valve. Monitoring the operation of the combined valve during exploitation should confirm the steps taken to design improvement.

Keywords: *construction improvement, combined valve, district heating systems*

ARSENIC (V) REMOVAL FROM WATER USING MAGNETITE NANOPARTICLES BIO-LINKED WITH APPLE PEEL WATER EXTRACT

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ABSTRACT:
The presence of arsenic in groundwater is a threat to human health if that water is used for water supply. In this work, suitability of bio-linked magnetite nanoparticles as adsorbent for arsenic removal from water was investigated. The bio-linked magnetite nanoparticles were synthesized from Fe (II) and Fe (III) sulfate salts by co-precipitation method in the presence of apple peel water extract. Using XRD technique it was confirmed that the product is magnetite. Using 5 g/L of adsorbent almost all content of As (V) was removed after 24 h of water treatment. The residual concentration of arsenic in the water after treatment was 2.57 µg/L, thus it can be concluded that, in terms of arsenic content requirements for drinking water, quality standard has been satisfied.

Keywords: *bio-linked magnetite nanoparticles, apple peel water extract, arsenic removal, water treatment, adsorption.*

Acknowledgements*: This work was supported by Ministry of Education, Science and Technological Development of Republic Serbia (Grant No. 451-03-68/2022-14/200134 and 451-03-68/2022-14/200125) and COST action (CA18130).*

TEMPERATURE CONDITIONS INFLUENCE ON THE CHANGE IN THE INITIAL VELOCITY OF THE 6.5 MM GRENDEL PROJECTILE

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ABSTRACT:
In this paper, the experimental method and mathematical procedure of measuring the 6.5 mm Grendel projectile initial velocity at different temperatures, were analyzed. A mathematical model of external ballistics has been defined, that is, a mathematical calculation of the projectile's velocity has been made for the given conditions. The aim was to perform a comparative analysis based on the obtained results (analysis of the experiment and the mathematical model of external ballistics). An experimental analysis of the effect with and without the gas device on the initial velocity of the 6.5 mm Grendel projectile was also performed. The aim of this paper was to determine, based on experimental testing and mathematical calculations, whether the gunpowder for the Grendel 6.5 mm projectile is thermostable.

Keywords: *Initial velocity, 6.5 mm Grendel projectile**,** Experiment*

MATERIALS IN 3D PRINTING

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ABSTRACT:
3D printing or additive manufacturing is a process of making three dimensional solid objects from a digital file. The creation of a 3D printed object is achieved using additive processes. In an additive process an object is created by laying down successive layers of material until the object is created. Each of these layers can be seen as a thinly sliced cross-section of the object. 3D printing technology can produce products with any complex shape, without processing problems, and solve the design and manufacturing problems of complex parts. Therefore, 3D printing technology is a very important production method in industrial manufacturing. Depending on the technology, one of the factors that significantly affect 3D printing is the material that will be used, and there is a wide range of materials such as plastic, metal, powders, carbon fibers etc. This paper present a review of materials used in 3D printing, as well as their advantages and disadvantages.

Keywords: *3D printing, Materials,Tehnology, Additive manufacturing*

A DETECTION OF CHANGES IN THE IMAGE USING FRACTAL ANALYSIS

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ABSTRACT:
The goal of this paper is to present a model for decision-making for the case of changes made to images by deliberately changing their content using a method copy/move forgery detection. The model uses multiple methods to achieve the best possible results. In the analysis of the image itself, we used the fractal dimension in order to obtain as few parameters as possible for the analysis of the image, without losing the quality of detection. The images used were from publicly available databases. The entire system is written in Python programming language.

Keywords: *copy/move forgery detection, image analysis, fractal, clustering*

DETERMINATION OF EMULSIFYING PROPERTIES OF BIOPOLYMER PRODUCED ON GLYCEROL-BASED MEDIUM BY LOCAL XANTHOMONAS ISOLATE

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ABSTRACT:
Xanthan is one of the commercially most important microbial polysaccharide which is produced by metabolic activity of bacteria of the genus Xanthomonas. Biodegradability, non-toxicity, unique rheological properties and stability under different conditions are the main reasons why this biopolymer is widely used as a thickener, adhesive, emulsifying and stabilizing agent in the food, pharmaceutical and oil-recovery industry. The aim of this study was to examine emulsifying properties of xanthan produced by Xanthomonas PL 3 strain, isolated from pepper leaves, on medium containing crude glycerol from biodiesel production. Emulsifying activity of 0.1% (w/v) xanthan solution was examined in the presence of n-hexane, toluene, chloroform, paraffin oil, sunflower oil, olive oil and soybean oil. The results of the emulsification test show that formation of emulsion of xanthan with chloroform, sunflower and soybean oil is reflected by the highest emulsification index with values higher than 60%. Slightly lower emulsification index with value around 50% was obtained with olive and paraffin oil. On the other side, the lowest value of emulsification index was obtained when n-hexane (15%) and toluene (22%) were used. The obtained results indicate that xanthan produced on the medium containing crude glycerol from biodiesel production can be used as an emulsion forming and stabilizing agent between aqueous solutions and hydrocarbons or oils. Findings from this study can contribute to future investigations related to the potential of specific xanthan applications.

Keywords: *Xanthomonas isolates, xanthan, biopolymer, crude glycerol, emulsifying properties*

Acknowledgements*: This study is part of the project (451-03-68/2022-14/200134) funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.*

WINE TOURISM IN NORTHERN CROATIA

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ABSTRACT:
This paper investigates the preferences of wine consumers in the area of northern Croatia. The paper describes the main characteristics of wine consumers. Along with a brief description of the history of wine, the current state of the wine market in the world and in Croatia will be described with an emphasis on wine tourism. The wine market in the world is well developed, and the countries that are at the very top of production are making great efforts to maintain their leading position. Traditional and autochthonous varieties are especially valued, and many tourists are willing to pay well for this uniqueness and quality, which is why wine tourism has been developing more intensly in the last 20 years. Thus, the consumption of wine is combined with the gastronomy, hospitality, culture and nature of an area and thus creates a tourism supply of the region. For the purposes of the work, a survey was conducted. The collected data were analysed using the methods of descriptive and inferential statistics. The following hypotheses were made in the paper: H1 Age affects the frequency of wine consumption; H2 Consumers in northern Croatia prefer white wines.

Keywords: *consumers, wine, preferences, northern Croatia*

VIRTUAL POWER PLANT: CHALLENGES AND OPPORTUNITIES

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ABSTRACT:
In recent years, the European electricity markets have reached a high level of liberalization, with one most important goal, to provide the end users of electricity with the lowest possible price. At the same time, the integration of renewable energy sources into distributed energy systems is increasing in accordance with the achievement of the goals of the green agenda and obtaining a greater share of "green energy" in the total production of electricity. The number of installations of small solar capacities at the point of consumption has increased in particular, leading to the fact that the current customers are becoming active customers, i.e. prosumers. Such customers generally do not meet the conditions for independent participation in the electricity market and thereby lose the opportunity to earn additional profit, and therefore their joint appearance on the market is necessary. In accordance of liberalized markets conditions, one of the ways of joint action is possible through the concept of "virtual power plant". This paper provides a general overview of the concept of a virtual power plant through the possibility of participating in different electricity markets, as well as an overview of the models developed so far for the energy management of virtual power plants. Also, challenges in implementation and opportunities for further development are described.

Keywords: *virtual power plat, electricity market, renewable energy sources*

APPLICATION OF VIRTUAL MODELS IN THE DESIGN OF A ROBOTIC GRIPPER

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ABSTRACT:
The development of the design of complex mechanisms using virtual models obtained by integrating different software packages is presented in this paper. The design, analysis and simulation of movement of the considered mechanism is carried out on the example of a robotic gripper. The SolidWorks software package is used to generate the 3D model. The virtual model and the control algorithm is realized in the MATLAB software package. An analysis of the required movements in order to achieve the production cycle of the mentioned mechanism is also carried out. By analysing certain parameters of the system, optimal characteristics of individual components were selected to obtain the required characteristics of the mechanism and a simulation of its operation was performed.

Keywords: *robotic gripper, virtual model, analysis, simulation, Matlab, SolidWorks*

NUTRITIONAL AND FUNCTIONAL PROFILE OF WILD GARLIC OSMOTICALLY DEHYDRATED IN SUGAR BEET MOLASSES

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ABSTRACT:
Wild garlic (Allium ursinum L.) has been used in traditional medicine since ancient times, but in recent years numerous studies confirmed its exceptional nutritional and antioxidant properties. Sulfuric and phenolic compounds contribute the most to the functional properties of wild garlic, as well as minerals, vitamins, dietary fibers, and volatile compounds. The molasses that remains after the industrial processing of sugar beet is a highly concentrated liquid mixture of sugar and many valuable compounds such as minerals and polyphenols. Due to the simple and cheap implementation in the process of osmotic dehydration and due to its favorable nutritional composition that enriches the dehydrated material, it has proven to be an excellent alternative to the usual osmotic solutions. By osmotic dehydration in molasses, at room temperature for 4 hours, in an ecologically, energetically and economically efficient way, the moisture content of wild garlic is reduced (over 50%). The paper analyzes the basic chemical composition, mineral substances (Mg, Na, K, Ca, Fe, Zn and Cu), total phenols, flavonoids and thiosulfinates in the wild garlic before and after osmotic dehydration. The results showed that molasses as an osmotic solution influenced the increase of total phenols by about 10% and flavonoids by about 15%, in dehydrated leaves, through the mass transfer during the process. Also, due to its rich mineral composition, molasses contributed to the increase of Ca and Mg by 1.2 times, Cu and Zn by 1.8 times, K by 3.56 times and Fe by 6 times in osmotically dehydrated wild garlic.

Keywords: *osmotic dehydration, wild garlic, sugar beet molasses, minerals, phenols*

COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

PREDICTION OF HOTEL RESERVATION CANCELLATION BASED ON MACHINE LEARNING MODELS

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ABSTRACT:
With the ever-increasing global focus on the tourism industry, the need to obtain different types of information from a large amount of data has emerged. This can be achieved by employing different machine learning (ML) models. The goal of this study is to design the specialized ML model that can successfully predict the outcome of a hotel reservation, based on its main characteristics, in order to establish better and more efficient decision-making process. This research is based on the assumption that there are hotel reservation parameters that can have a positive or negative impact on their realization. In this paper, a real hotel data was used, which includes the basic characteristics of reservations in two hotels in Lisbon, Portugal. The methodology in this research included several steps of data preprocessing in order to transform the data into a suitable form for model training. In addition, comparison of ML models based on their results obtained through the conducted experiments was performed. Several different ML models with different hyperparameter values were designed and tested (Random Forest, C4.5, and K-nearest neighbors). The highest accuracy was achieved using the Random Forest algorithm (88.70%). The results show the potential of machine learning application in hotel management, primarily when determining the optimal occupancy schedule of hotel capacities. This represents a significant business advantage, and it is critical in the period of increased tourist demand. Also, the information and knowledge derived from designed ML models can be used to improve planning, management, and marketing activities.

Keywords: *Machine Learning, Random Forest, C4.5, K-nearest neighbors, Tourism*

ROBOTIC GRIPPER SIMULATION USING MATLAB SOFTWARE

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ABSTRACT:
In this paper, a robotic arm end effector - gripper is developed and simulated using the software packages SolidWorks and MatLab. The creation and CAD modeling of the robotic gripper is shown in the first section of the paper. A 3D model has been created in this section. The .stl and .xml files needed for simulation, this model has been exported. A MatLab Simulink mechanical simulation program is created in the second section. In this section Simulink blocks has been described. Simulation result is shown by diagrams in the third section. The proper discussion of shown results has been done.

Keywords: *robotic arm, end effector, gripper, MatLab*

THE USE OF VIRTUAL AND AUGMENTED REALITY IN DIGITAL MARKETING

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ABSTRACT:
In recent years, virtual reality (VR) and augmented reality (AR) technologies have advanced quickly, and they have many potential uses in digital marketing. This paper offers a summary of the acceptance and use of VR and AR in the field of digital marketing, as well as a case study of an effective marketing campaign that has made use of these technologies. The research also looks at the advantages of VR and AR in digital marketing, including improved customer engagement and elevated brand loyalty. The possible effects and difficulties of VR and AR in digital marketing are also discussed in the paper, including the necessity for specialized knowledge and tools as well as the potential for significant expenses. The discussion of future trends and opportunities in VR and AR for digital marketing, including the growing usage of these technologies in e-commerce and the potential for VR and AR to alter how brands connect with customers, finishes the paper. Overall, the paper offers advice for companies looking to integrate VR and AR into their digital marketing strategies. These recommendations include the significance of investing in specialized knowledge and tools as well as keeping up with the most recent trends and advancements in VR and AR technologies.

Keywords: *Virtual Reality, Augmented Reality, Digital Marketing, Virtual reality brand experiences, Increased brand loyalty*

THE INFORMATICS ASPECT INTEGRATION OF PROCESSING APPROACH OF QMS

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ABSTRACT:
The processing approach is a basic principle of a management quality system. Monitoring and measuring are the requirements of the management quality system. Introducing the indicators as well as their further development and control should be one of the essential tasks of each organization. Therefore, while projecting the database, it is necessary to predict the connection between the very process and its indicators which are used for measuring since it is the only relevant indicator of success. The paper presents the informatics aspect for the development model of transactional base that integrates business processes QMS and their indicators.

Keywords: *the processing approach, QMS,integration*

TEXT-TO-IMAGE AI GENERATOR TOOL ENGINE AND PERFORMANCE COMPARISON OF POPULAR MODELS

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ABSTRACT:
Text-guided image synthesis has, during the last couple of years, made giant leaps towards becoming a mainstream custom image generating tool. Using text-to-image generation tools, anybody can create digital images and artworks using basic human language. In the last year, many different systems suddenly become publicity available, using similar, but different technologies for their generation application. Even though the basis for most of these tools is AI and neural networks, the final result differs dramatically depending on users choice of tool. As of today, fine comparisons of these systems and interesting models are rare. In this paper we conduct a performance and final result comparison between popular models. The proposed test involves comparing the ability of observed models to generate artificial environments using same detailed text as the input, and the final results are shown as to differentiate between the said models. Likewise, we hope that our study spurs follow-up research in investigating these generative models and finding their differences.

Keywords: *Artificial Intelligence, Computer Graphics, text-guided image synthesis, AI art, generative art.*

PSEUDO INTEGRALS FOR FACE RECOGNITION

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ABSTRACT:
Aggregation functions play a significant role in multi-criteria decision-making theory. Pseudo integrals are a special class of those functions - the most famous being (among which) Choquet's and Sugen's integrals are the most famous. Face recognition plays a big role, e.g. in border control, verification of passports and other documents, in addition to the application of classic methods, e.g. PCA, linear discriminant analysis, as well as various local descriptors, other methods such as sparse representation, deep learning, etc. are used. Each part of the face can be compared with the corresponding part, but from all these comparisons a conclusion should be drawn about the match-overlap or not of the two faces. Aggregation functions play a significant role in all of this.

Keywords: *aggregation function, face recognition, pseudo integral*

USING 3D PRINTERS TO IMPROVE SPATIAL VISUALIZATION IN TEACHING ENGINEERING GRAPHICS

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ABSTRACT:
The paper presents the application of 3D printers in the teaching of Engineering Graphics at the Faculty of Technical Sciences in Čačak. The printer used in the class belongs to a group of printers that make 3D models by melting the material and fusing it (Fused Filament Fabrication). The basic idea is to use 3D printing technology in teaching to increase students' practical skills and understanding of three-dimensional space. The process of creating a model from its creation in Solidworks to printing on a FELIKS Tec 4 printer is presented.

Keywords*: 3D modeling, 3D printing, SolidWorks, FELIX Tec 4, education*

GRAPHICAL INTERPRETATION OF CHARACTERISTICS OF MAGNETIC CIRCUITS, INDUCTION MACHINES AND HEATING OF DIFFERENT TYPES OF ELECTRICAL DRIVES USING GEOGEBRA SOFTWARE SUPPORT

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ABSTRACT:
The paper describes applications developed in GeoGebra software as an aid in teaching electrical machines and drives. One set of developed applications pertains to the analysis of magnetic circuits with an air gap excited by direct or alternating current, as well as magnetic circuits with permanent magnets. The second set of applications concerns the comparative graphical representation of the torque vs speed characteristics of induction machines, as well as the analysis of the heating of different types of electrical drives with the possibility of selecting different duty cycles (intermittent periodic duty) with or without the influence of starting and electrical braking. The developed applications are primarily intended for students at the Faculty of Technical Sciences in Čačak as an aid in mastering a part of the teaching material on electrical machines and drives. Additionally, the applications are publicly available and can be accessed by anyone interested in easily and interactively understanding the basic operation principles, with the ability to quickly obtain or verify results when designing magnetic circuits or analysing the operation of electrical drives.

Keywords: *magnetic circuit, permanent magnets, GeoGebra, induction machines characteristic, intermittent periodic duty, electric machine heating.*

INDUSTRIAL ROBOT SELECTION BY USING FUZZY WISP METHOD

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ABSTRACT:
Industrial robots are computer-controlled mechanisms used in manufacturing to perform various tasks. They play an important role in production and have several significant advantages, such as: increasing efficiency and productivity; cost reduction; improving safety, improving product quality and overall improving production process. Therefore, selection of an industrial robot is a major problem of modern manufacturing companies. Multi-criteria decision-making method (MCDM) is exactly suitable for solving such problems. Aim of this paper is to provide a model for industrial robot selection. Regarding to that, a newly-develoepd fuzzy WISP method will be employed for industrial robot selection.

Keywords: *industrial robots; robot selection; fuzzy WISP, MCDM*

CREATION OF ANIMATIONS AND MOVEMENT CONTROL IN FLASH

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***ABSTRACT*:**
The paper discusses the multimedia tool Adobe Flash, in which it will be shown the process of creating animations using software tools for drawing and animating along the time axis. Animations consist of a series of individual images (frames), which are animated on a timeline. The timeline allows us to control the content of the movie, which means controlling when it will appear, move and change. Control and interactivity are achieved using ActionScript, Flash's internal script.
Today, Flash is one of the most popular tools for creating interactive and animated content on the web. One of the most reliable ways to download a Flash movie is to use vector graphics instead of bitmaps. By converting bitmap to vector graphics, you can save on file size and achieve interesting effects.

Keywords: *Adobe Flash, animation, ActionScript, frames*.

CLICKER: AN ONTOLOGY DRIVEN PLATFORM FOR E-ASSESSMENT

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ABSTRACT:
In this paper, semantic representations of different types of assessment materials in the form of question ontologies are proposed with a goal to facilitate agile development of e-assessment platforms, including customization, extension, management and deployment. The goal is to empower not necessarily IT-savvy course administrators to quickly and conveniently develop e-assessment platform (referred to as "Clicker" in this paper) customized for their specific scientific field with appropriate question types by applying automatic code generation. The approach is cloud-ready and scalable on a number of courses, a number of students and different knowledge domains. MAMO (Medical Assessment Methods Ontology) is developed and used as a question ontology. It enables semantic descriptions of questions that are commonly used in medical education field but that can be applied in other knowledge domains as well. According to the evaluation results, the proposed approach dramatically speeds up the development and extension of e-assessment platforms, especially when it comes to inclusion of more complex question types.

Keywords: *e-assessment platform, ontology, semantic web*

PROBDISTID: A WEB-BASED TOOL FOR IDENTIFYING AND PARAMETER ESTIMATION OF PROBABILITY DISTRIBUTIONS

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ABSTRACT:
Accurately identifying the appropriate probability distribution and the corresponding distribution parameters for input data is essential in a wide range of disciplines, as it can lead to better understanding, modeling, and prediction of the phenomenon under study.
In this paper, we present ProbDistID, a versatile R-based web application that simplifies identifying probability distributions and their parameters for user-selected scenarios. Applicable to different fields addressing probability distribution identification, our tool employs the Levenberg-Marquardt Nonlinear Least-Squares Algorithm to fit input data to chosen distribution models. Users can select suitable probability distributions, define expected parameter value ranges, generate random data for testing or import datasets in batch files, and customize data preprocessing to optimize fitting. The web application displays the fitting results in a tabular format, featuring various goodness-of-fit tests and model selection methods, allowing users to make informed decisions about the appropriate probability distribution.
The presented approach, which requires no a priori knowledge of input data and is suitable for real-time probability distribution recognition, provides a comprehensive solution for data-driven decision-making across numerous applications, making it a valuable resource for data mining tasks. We validate the utility and effectiveness of our application through a case study in the wireless communication fading scenario, showcasing its ability to deliver accurate and reliable results.

Keywords: *data mining, nonlinear regression, probability distribution recognition, model selection, curve fitting*

IMPLEMENTATION OF AN ADAPTIVE CONTENT-BASED IMAGE RETRIEVAL SYSTEM FOR SEARCHING IMAGES BASED ON COLOR HISTOGRAMS

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ABSTRACT:
The Internet today represents an unlimited database. Quick search and extraction of the desired content is a priority for all users. In addition to textual content, users are increasingly searching for other multimedia content (image, video, animation, sound). That is why it is necessary to develop algorithms for fast search of multimedia content based on attributes such as image size, resolution, primary color, type, etc.
In this paper is presented an adaptive content-based image retrieval system for searching multimedia content. A system is implemented in the Python programming language using the color histogram method and the CV library. The Euclidean distance was used to compare the similarities between the photos that were previously indexed. The implementation of the search engine is used for the recommendation system of clothing combinations based on colors, where it is possible to search for similar clothing that has a color match with the image from the query. To test the system, a corpus of photos consisting of 2055 photos of wardrobes, with different colors and types, is used.

Keywords: *image retrieval, python, CV library, clothing recommendations, color histograms*

ARDUINO BASED REMOTE CONTROL CAR

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ABSTRACT:
In this paper, a remote control car model based on the Arduino platform was realized. This system uses an Arduino UNO with an ATmega328P microcontroller to manage the sensors and other components that make up the car. The drive of the car is based on the TB6612FNG motor control board. Various sensors are connected to the car that will enable a variety of functions, such as following a line drawn on the floor, avoiding obstacles using RGB sensors and obstacle avoidance sensors, light tracking and hand movement tracking. The floor of the car is made of 5 mm thick plywood to which all components will be attached. The car cover, or the body, was modeled on a computer and then printed using a 3D printer. The car uses 4 plastic and rubber wheels to move, and each wheel is connected to its own separate motor. The car's Bluetooth sensor, which is connected to the engine control panel, allows the Arduino to connect and communicate with the smartphone. After turning on the assembly, it is necessary to turn on the application on the smart device and connect using Bluetooth. In the application's interface, we can choose whether to just drive the car or we can choose one of the functions such as line tracking, light tracking, motion tracking or obstacle avoidance. In the application, we can also select a function that allows us to control it via the remote control. If we choose the manual control mode, we use the buttons in the application to control the car and we can also change the speed at which the car will move. In the case of selecting automatic steering, i.e. the option for the car to move by itself, the car starts using an ultrasonic sensor to detect obstacles.

Keywords: *Arduino UNO, TB6612 control board, ultrasonic sensor, line tracking sensor, 3D printer*

GENETIC ALGORITHMS AS ARTIFICIAL INTELLIGENCE SUPPORT TO SUSTAINABLE OPTIMIZATIONS OF COMPLEX SYSTEMS

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ABSTRACT:
The main goal of this paper was to find an optimal nature inspired model, which will simulate on the most adequate way all the conditions and restrictions, requirements and conflicting interests of one energy system. The main goal of the optimization of one energy system is to find an optimal operation mode at the present stage, and to research possible future optimal installation from the aspect of cost and sustainability, considering technical and economical criteria, as well as emission and other environmental criteria. Different scenarios of introducing renewable power plant in a whole energy system of one country are developed. Evolutionary multiple objective genetic algorithms are applied. The results of such artificial intelligence model show the maximal economy, technical and environmental effects of introducing higher capacities of renewable resources in a system.

Keywords: *genetic algorithm, artificial intelligence, nature inspired optimization, sustainability, environment.*

INFORMATION TECHNOLOGIES IN THE FUNCTION OF RISK AND HAZARD IN WATER MANAGEMENT RESOURCES

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ABSTRACT:
The dams are the main structures necessary for water resources management. Those are usually big and specific construction which failor could have catastrofic consecuences for the people, setlements and environment. The Internet of Things as advanced technology enables the formation of an information field, which describes objects and processes on dams. At the same time, thanks to the possibilities of the Internet, communication and information technologies, it enables the registration, transfer, storage, processing and distribution of data. Data can be used on any geographic location in real time, if appropriate communication channels exist. Data can be used almost simultaneously with their creation. Also, information and communication technologies enable fast data processing and their presentation in a form that enables fast decision-making. This manuscript encompase the research on dam accident happened and matematiq objective phormulas development, coveringr dam safety and introducing internet of things.

Keywords: *information technology, risk management, water resources management, dams, internet of things.*

SOLVING THE LINEAR PROGRAMMING PROBLEM USING SOFTWARE WINQSB

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ABSTRACT:
Linear programming is a special mathematical method used in operational research and is the basis for solving many problems contained in mathematical programming. With the help of various software packages this method has spread to almost all segments of life and business, especially when it comes to production optimization. Based on this, the paper presents a mathematical model of linear programming that serves to optimize production from the aspect of maximum use of production potential while respecting market restrictions. WinQSB software was used to solve the specific problem. WinQSB is a software package that is very intuitive to use and does not require knowledge of programming languages and writing complicated programming codes. In addition, it contains modules for almost all research problems in the field of operational research and business decision making.

Keywords: *linear programming, optimization, production potentials, WinQSB*

BIOLOGY, PHYSICS, CHEMISTRY, MATEMATICS

ALGAL FLORA OF CRVENE BARE PEAT BOG (MT. KOPAONIK, SERBIA)

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ABSTRACT:
The main purpose of the study was to record the floristic characteristics of the algae assemblages of the peat bog Crvene Bare, Mt. Kopaonik, Serbia. Peat bog Crvene Bare is situated on Mt. Kopaonik, Serbia at an altitude of 1645 m.a.s.l. (43˚17'47"N, 20˚48'37"E), developed on a water-saturated surface of about 2.5 ha, surrounded by spruce forests. It is protected by the national legislation (II protection regime). There are no literature data about the morphology, distribution and ecology of algae from the peat bog Crvene Bare. The algological samples were collected in July 2022. Samples of phytobenthos were collected with a pipette from the surface of the bottom deposits. Epiphytic samples were collected by squeezing out or scraping off dominant mosses. All samples were fixed with formaldehyde to a final concentration of about 4% shortly after sampling. Light microscope observations and micrographs were made using a Zeiss AxioImagerM.1 microscope with DIC optics andAxioVision 4.8 software. On the basis of relevant literature, algae from 7 phylums (Cyanobacteria, Rhodophyta, Chlorophyta, Charophyta, Euglenozoa, Miozoa, Heterokontophyta) were identified. The most diverse and most common were diatoms, desmids and cyanobacteria.

Keywords: *algae, peat bog, Kopaonik, Serbia*

SYNTHESIS, CHARACTERIZATION AND KINETIC STUDIES OF NEW MONONUCLEAR RUTHENIUM(II) POLYPYRIDYL COMPLEXES

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ABSTRACT:
*We have prepared a series of new monofunctional Ru(II) terpyridine complexes with general formula mer-[Ru(L_3)(N-N)Cl]Cl, where L_3 is 2,2':6',2''-terpyridine (tpy) or 4'-(4-chlorophenyl)-2,2':6',2''-terpyridine (Cl-Ph-tpy), while N-N is o-benzoquinonediimine (o-bqdi), 2,3-naphthoquinone diimine (nqdi), 4,4'-dimethyl-2,2'-bipyridine (dmbpy) or 2,2'-bipyridine-4,4'-dicarboxylic acid (dcbpy). The complexes were characterized by elemental analysis and by various spectroscopic techniques, such as IR, UV-Vis, ^{1}H and ^{13}C NMR, and ESI-MS. The synthesis of the chloride salts of complexes **1 – 7** was performed by reacting the neutral Ru(III) precursors mer-[Ru(tpy)Cl_3] or mer-[Ru(Cl-Ph-tpy)Cl_3] with the respective aromatic chelating ligand under the reflux. Ru(II) complexes with quinone diimine ligands o-benzoquinonediimine (o-bqdi, **1** and **2**) or 2,3-naphthoquinone diimine (nqdi, **5**) were prepared as a product of the reaction of the corresponding Ru(III) precursor with the redox-active ligands o-phenylenediamine (o-pda) or 2,3-diaminonaphthalene (dan) upon their oxidation to an imine species. The kinetic results showed that the ligand substitution reactions of new Ru(II)-polypyridyl complexes with biomolecules (guanine derivative guanosine-5'-monophosphate, and sulfur-containing amino acids L-cysteine and L-methionine) were affected by different substituents and aromaticity of meridional tridentate and bidentate spectator ligands as well as by the nature of the entering nucleophile. The reactivity of the complexes increases in the order: Ru(dmbpy) < Ru(dcbipy) < Ru(nqdi) < Ru(o-bqdi).*

Keywords*: quinone diimines, ruthenium(II), terpyridine, mechanism*

^{1}H NMR STUDY OF THE REACTIONS BETWEEN DINUCLEAR PLATINUM(II) COMPLEXES AND GUANOSINE-5'-MONOPHOSPHATE

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ABSTRACT:
Platinum-based drugs, as classical chemotherapeutic agents, have ability to form intrastrand covalent adducts with DNA by binding of Pt to the N7 atoms of two adjacent guanine bases. A novel class of promising antitumor agents with potential clinical significance represent polynuclear platinum complexes. In present investigation, dinuclear $\{[Pt(L)(Cl)]_2(\mu\text{-pz})\}Cl_2$ complexes (L is bidentately coordinated ethylenediamine (en), 1,3-propylethylenediamine (1,3-pd), and 2,2-dimethyl-1,3-propylethylenediamine (2,2-diMe-1,3-pd), pz is the bridging ligand pyrazine (1,4-diazine)) were synthesized and their structure was confirmed based on the results of elemental microanalysis and NMR spectroscopy (^{1}H and ^{13}C). The reactions between guanosine-5'-monophosphate (5'-GMP) as biologically relevant ligand and synthesized dinuclear Pt(II) complexes were studied by ^{1}H NMR spectroscopy. It was found that in the reactions of the $\{[Pt(L)Cl]_2(\mu\text{-pz})\}^{2+}$ complexes with the nucleotide guanosine-5'-monophosphate (5'-GMP) in a 1 : 1 molar ratio (pH = 7.40 in 50 mM phosphate buffer) only one complex, $\{[Pt(L)(5'\text{-GMP-N7})](\mu\text{-pz})[Pt(L)Cl]\}^{+}$, was formed in the solution after 24 hours of reaction time. The rate of the coordination reaction of 5'-GMP, through the N7 nitrogen atom of guanine, for the investigated dinuclear $\{[Pt(L)(Cl)]_2(\mu\text{-pz})\}Cl_2$ complexes depends on the nature of the bidentately coordinated diamine ligand L. The second-order rate constants (k_2) were determined, showing that as the steric effect of ligand L increases in the series en > 1,3-pd > 2,2-diMe-1,3-pd, the values of the constants k_2 decrease. According to this, k_2 values indicate that $\{[Pt(en)(Cl)]_2(\mu\text{-pz})\}Cl_2$ complex shows the best binding ability for 5'-GMP.

Keywords: *dinuclear platinum(II) complexes, guanosine-5'-monophosphate, ^{1}H NMR spectroscopy*

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RADIOACTIVITY MESUREMENTS OF FISH SAMPLES FROM SERBIAN MARKETS

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ABSTRACT:
Concentrations of naturally occurring radionuclides (226Ra, 232Th and 40K), as well as anthropogenic radionuclides (134Cs and 137Cs), in a total of 10 fish samples (freshwater species Oncorhynchus mykiss and Cyprinus carpio, and marine species Merluccius merluccius and Scomberscombrus) were purchased on Serbian markets have been measured to better understand background radiation levels in daily food diet. This investigation verified that the main source of radiation exposures from fish intake is ^{40}K. In this study, none of the fish samples examined had any ^{134}Cs at measurable levels. An average ^{137}Cs level was below 20 $Bq.kg^{-1}$. The resulting radiation dose for people from fish consumption would be a very small fraction of the annual dose from exposure to natural background radiation. According to the findings, fish from Serbian markets do not present a radiological health risk.

Keywords: *fish samples, gamma spectrometry, radioactivity concentrations*

BIO-MODIFIED UREA-FORMALDEHYDE RESINS: CONTENTS OF FREE AND LIBERATED FORMALDEHYDE

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ABSTRACT:
In this work, urea-formaldehyde (UF) resins modified with biomaterials are analyzed. UF resins, as the leading adhesive of the wood industry, with exceptional characteristics in terms of high reactivity, efficiency, economy, and resistance to microorganisms, absence of the emission of formaldehyde (FA), a substance that, even in low concentrations, has a harmful effect on the living world. A major drawback of these resins is their poor resistance to hydrolysis when formaldehyde emission occurs. The content of FA emission from wooden panels can be reduced by using different substances based on inorganic and organic materials, and by adding them to the resin synthesis process resin. In this work, betaine (modified amino acid consisting of glycine with three methyl groups) and tannin (complex biomolecules of polyphenolic nature) were used as biomaterials. Determination of free FA in modified UF resins was performed using the disulfite method. The percentage of free FA in betaine-modified UF resin is 0.1%, while the percentage of free FA in tannin-modified resin is 0.8%. The hydrolytic stability of the modified UF resins was determined by measuring the concentration of liberated FA in the modified UF resins, after acid hydrolysis. The results show that the percentage of liberated FA in UF resins modified with betaine is 3.6%. The percentage of liberated FA in tannin-modified UF resins is 7.4%.

Keywords: *Betaine, Tannin, Urea-formaldehyde resin, Free and liberated formaldehyde*

Acknowledgements*:Financial support for this study was granted by the Ministry of Science and Technological Development of the Republic of Serbia, Project Number 451-03-68/2022-14/200123).*

LUMINESCENT PROPERTIES OF PRASEODYMIUM-DOPED PHOSPHATE TUNGSTEN BRONZE

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ABSTRACT:
Nowadays phosphate tungsten bronzes (PWBs) attract a lot of attention due to their interesting chemical, mechanical, and optical features. Moreover, tungsten bronzes as inert inorganic solids, with incorporated rare-earth ions in their structure, show interesting and useful electronic properties. Praseodymium doped phosphate tungsten bronze (Pr-PWB) is obtained in the process of phase transformations of $PrPW_{12}O_{40}\cdot 6H_2O$ *(Pr-PWA) salt. The green crystals of Pr-PWB are formed after the heating of Pr-PWA in a furnace, in a temperature range from room temperature to 650 °C. In the present paper the fluorescent properties are analyzed of Pr-PWB, its precursor – 12-tungstophosphoric heteropoly acid,* $H_3PW_{12}O_{40}\cdot 29H_2O$ *(PWA) with Keggin's anion structure, as well as the intermediate – Pr-PWA salt. The luminescent properties where characterized and the obtained results showed that both samples emit in the deep blue region, indicating their potential use as a blue emitting source for white light LED's.*

Keywords: *phosphate tungsten bronzes, praseodymium, luminescent properties*

SYNTHESIS, CHARACTERIZATION AND HSA/DNA INTERACTIONS OF NEW [$RH_2(CH_3COO)_4L_2$)] COMPLEX

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ABSTRACT:
In this report, we have synthesized a complex of [$Rh_2(CH_3COO)_4(H_2O)_2$] and 1-Butylimidazole ligand (L). To a solution of [$Rh_2(CH_3COO)_4(H_2O)_2$] (0.0478 g, 0.10 mmol) in toluene (10 mL), 1-Butylimidazole ligand (L) (0.0290 mL, 0.22 mmol) was added. The resulting mixture was stirred at room temperature for 1h until the reagents were completely dissolved. The solution left at room temperature to slowly evaporate to a volume of 6 to 7 mL and then it was left in the refrigerator over night. The violet crystals that precipitated were filtered off under a vacuum and washed with diethyl ether. The characterization of the synthesized complex [$Rh_2(CH_3COO)_4L_2$)] was performed using by elemental microanalysis, IR and NMR, as well as by determining the melting point. The interactions of the new complex with human serum albumin (HSA) and calf thymus DNA (CT-DNA) molecules were examined using fluorescence spectroscopy, as well as docking experiments on the mentioned molecules. 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: *rhodium(II), metal complex, CT-DNA interactions, HSA interactions, docking experiment*

SYNTHESIS AND CHARACTERIZATION OF PLATINUM(IV) COMPLEX WITH 2-AMINO-6-CHLOROBENZOTHIAZOLE

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ABSTRACT: *The synthesis of novel platinum(IV) complex of general formula [PtL_2Cl_4] are reported. The complex (**C**) has been obtained by direct reaction of potassium-hexachloroplatinate(IV) with derivative of 2-aminothiazole (**L**= 2-amino-6-chlorobenzothiazole. Thiazole, a 5-membered unique heterocyclic compaund containing sulphur and nitrogen atoms, serves as an essential core scaffold in several medicinally important compounds. Thiazole nucleus is a fundamental part of some clinically applied anticancer drugs. Thiazole and its derivatives are amongst most active classes of compounds that are known for their broad spectrum of activity. The reported platinum(IV) complex was characterized by elemental microanalysis and their structure was discussed based on the results of infrared, ^1H and ^{13}C NMR spectroscopy.*

Keywords: *synthesis, 2-aminothiazole, platinum(IV) complex*

SYNTHESIS, CHARACTERIZATION NOVEL LIGAND AND CORRESPONDING COMPLEX WITH PALLADIUM(II) IONE. DNA/HSA BINDING OF PALLADIUM(II) COMPLEX

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ABSTRACT:
In this paper, we presented synthesis, characterization, DNA and HSA binding of novel compounds ligand S,S-propylenediamine-N,N'-di-(4,4'-methyl)pentanoic acid of general formula, H_2-S,S-pddmp·2HCl·2H_2O and their palladium(II) complex of general formula, [$PdCl_2$(S,S-pddmp)]. The ligand has been obtained in reaction of S-Leucine (2 mol) and 1,3-dibrompropane (1 mol) in base medium (NaOH). The complex has been obtained by direct reaction of corresponding ligand and potassium tetrachloropalladate(II) in wather solution. The ligand and complex were characterised by elemental microanalysis, infrared, ^1H and ^{13}C NMR spectroscopy. The interactions of the new palladium(II) complex with calf thymus DNA (CT-DNA) and human serum albumin (HSA) were studied by fluorescence spectroscopy. The high value of the binding constant, Kb, and the Stern-Volmer quenching constant, KSV, are the result of good binding of the complex to CT-DNA and HSA.

Keywords: *synthesis, palladium(II), propylenediamine, DNA/HSA interaction*

TEMPERATURE PATTERN MEASUREMENTS IN BRIGGS-RAUSCHER OSCILLATORY REACTION WITH THE STATE I TO THE STATE II TRANSITION

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ABSTRACT:
Thermal monitoring of a Briggs-Rauscher oscillatory reaction with a phase transition or the state I (low concentration of iodide and iodine) to the state II (high concentration of iodide and iodine) transition with formation of new solid iodine phase is presented. This is the very first time that an oscillatory reaction and the state I to state II transition have been monitored using a thermal camera. It should be pointed out, that the BR reaction solution is not homogenized by stirring, and that only oxygen production influence the solution mixing. Therefore, the analysis was done at three sampling points on the cuvette where temperature change over time was observed, and compared with average temperature distribution. The first point is chosen to correspond to the top of the solution in the cuvette, followed by one in the middle of the volume and one at the very bottom of the cuvette. Although the state I to the state II transition itself is not reproducible (investigated transition exhibits crazy clock behavior), the overall temperature pattern has shown a reproducible character.

Keywords: *temperature distribution, Brigs-Rauscher reaction, crazy clock*

STRUCTURED LIGHT FOR LASER PROCESSING OF POLARIZATION-SENSITIVE MATERIALS

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ABSTRACT:
In this paper, we present some examples of the use of structured laser beams for laser processing of thin films of carbazole-based polymer 9-(2,3-epoxypropyl) carbazole (EPC) and azo dye Disperse Orange 3 (DO3) as well as nanomultilayer structures based on the chalcogenide glasses As_2S_3 and a-Se. These materials are well-known because of their sensitivity to the polarization of the illuminating radiation. Recently, the unique possibilities of processing of such materials using structured laser radiation with the predetermined amplitude and polarization distributions have been demonstrated. Structured laser beams provide more opportunities for the formation of unusual two-dimensional and three-dimensional reliefs that, in principle, cannot be produced using Gaussian laser beams. The distributions of polarization and the longitudinal component of light play the key role in determining the shape of nano and microstructures formed on the surface of thin films of these materials. We present both numerical and experimental results demonstrating the possibilities of controlling the profiles of the formed microstrcutures. This work was financially supported by Russian Science Foundation (grant No. 22-79-10007).

Keywords: *azopolymer, chalcogenide glasses, structured light, polarization, laser processing*

PREPARATION AND CHARACTERIZATION OF ACTIVATED CARBON OBTAINED FROM BIO-WASTE USING BASES AS ACTIVATORS

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ABSTRACT: *Activated carbon is a highly porous and adsorptive material that is widely used for various applications such as wastewater treatment, air purification, and energy storage. Activated carbon can be produced from various raw materials, including biomass, which is a sustainable and renewable resource. The process of producing activated carbon from biomass involves two main steps: carbonization and activation. In the carbonization step, the biomass is heated in the absence of oxygen to convert it into carbon. The resulting carbonaceous material is then activated using a chemical or physical process to create a highly porous structure with a large surface area. One way to activate the carbonized biomass is to use bases as activators. Bases such as potassium hydroxide (KOH) and sodium hydroxide (NaOH) have been used as activators due to their ability to promote the development of micropores and mesopores in the carbon structure. Activated carbon was characterized by various techniques such as scanning electron microscopy (SEM), Brunauer–Emmett–Teller (BET) analysis, Fourier transform infrared (FTIR) spectroscopy and X-ray diffraction (XRD) analysis. These techniques provide information on the surface area, pore size distribution, functional groups, and crystal structure of activated carbon.*

Keywords***:*** *biowaste, active carbon, bases, activator*

INVESTIGATION OF THE EFFICIENCY OF LEACHING TEST OF TOTAL CHROMIUM IN SILT LOAM

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ABSTRACT:
The paper analyzes the efficiency of extraction of total chromium from a composite sample of silt loam (waste soil). Ultrapure water, TCLP (Toxicity Characteristic Leaching Procedure) extraction solution, DTPA (diethylenepentaacetic acid) extraction solution and aqua regia (Aqua regia, AR) were used as leaching agents. The water-soluble form of Cr was determined by water leaching, the toxic amount of Cr was examined with TCLP, the easily accessible form of Cr was examined with DTPA, and the total amount of Cr with aqua regia. The test results showed that the highest Cr content is 820 mg/kg in aqua regis, 56.7 mg/kg in DTPA, 1.65 mg/kg Cr in TCLP, and 3.79 mg/kg Cr in water. The results indicated that the largest concentration of total Cr is bound to the silicate fraction of the soil, and as such is more difficult to leach with TCLP, DTPA and water.

Keywords: *total chromium, environment, soil, leaching test*

ON THE MORPHISM THEOREM

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ABSTRACT:
In this paper we will look at the relations of asymptotic equivalence : weak asymptotic equivalence, strong asymptotic equivalence and asymptotic similarity. Let there be given two positive functions defined for x>a, (a>0), and unbounded in infinity. Let them be mutually in one of these relations. We will discuss when they will find themselves once again in one of these relations (if and only if) after the composition of functions with any fixed, measurable and positive functions F(x),x>a. This discussion, we shall carry out in terms of classical Karamata's theory of regularly variability (see [1] and [2]).

Keywords: *Karamata's theory, relations of asymptotic equivalence*

LITERATURE:
[1] *Bingham, N., Goldie, C. and Teugels, J. (1987), Regular variation, Cambridge Univ. Press, Cambridge.*
[2] *Djurčić, D. (1998), $\mathcal{O}$- regularly varying functions and strong asymptotic equivalence, Journal Math. Anal. Appl., No. 220, 451-461.*

ANALYTICAL SOLUTION FOR NONCENTRAL GENERALIZED OSCILLATOR SYSTEM

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ABSTRACT:
Noncentral generalized oscillator system is the basic model in the Physics since it can be use in order to explain dynamics of any physical system. In this study Schrödinger equation for the potential is solved analytically by using extended Nikiforov Uvarov method. Both radial and polar parts of the wave equation are investigated by thse method. The generalized system includes ring shaped oscillator potential and isotropic harmonic oscillator potential. Eigenvalue relations for radial and polar parts of the Schrödinger equation are obtained as conditions which present existing of biconfluent Heun polynomials and Heun polynomials respectively. Thereby wavefunctions for the system are obtained in terms of Heun type polynomials. Extended form of Nikiforov Uvarov method is proposed as an efficient solution method for relativistic or nonrelativistic wave equations with noncentral potentials which have more information about physical systems.

Keywords: *extended Nikiforov Uvarov method, noncentral potentials, Heun polynomials, generalized oscillator system*

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ON TOTAL INTEGRABILITY

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ABSTRACT:
In this paper, we explicitly prove that a necessary and sufficient condition for some point function $\boldsymbol{f}$ *on* $[\boldsymbol{a},\boldsymbol{b}]$*, to be generalized* ***Riemann*** *integrable over* $[\boldsymbol{a},\boldsymbol{b}]$*, is that there is a charge* $\mathfrak{I}$ *on* $\mathrm{I}([\boldsymbol{a},\boldsymbol{b}])$*, such that the differential forms* $\delta\mathfrak{I}$ *and* $\delta\boldsymbol{F}$*, where* $\boldsymbol{F}=\langle\boldsymbol{\mu f}\rangle$ *and* $\boldsymbol{\mu}$ *is the* ***Lebesgue*** *measure, are basically summable equivalents on* $[\boldsymbol{a},\boldsymbol{b}]$ *and that* $\delta\mathfrak{I}$ *is the total differential on* $[\boldsymbol{a},\boldsymbol{b}]$*. In addition,* $\mathfrak{I}$ *must be the generalized absolutely continuous* ($\boldsymbol{ACG_\delta}$) *function on the null subset of points* $\boldsymbol{E}$ *of the interval* $[\boldsymbol{a},\boldsymbol{b}]$*, in which the function* $\boldsymbol{f}$ *is not differentiable. It will be shown that the difference between the total and particular antiderivative on* $[\boldsymbol{a},\boldsymbol{b}]$*, is equal to the sum of the residue function* $\mathfrak{R}_F$ *of the total antiderivative* $\boldsymbol{F}$ *of the function* $\boldsymbol{f}$ *on the set* $\boldsymbol{E}$*. Finally, all of this is illustrated by a couple of representative examples.*

Keywords: *basic summability, total integrability*

COSMIC RAY FLUX-APPLICATIONS AND MEASUREMENTS

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ABSTRACT:
It has been well known for more than half a century that solar activities have a strong influence on cosmic ray flux reaching to the Earth. Since most of the cosmic ray showers are occuring between the upper troposphere and lower stratosphere, simultaneous cosmic ray flux measurement at the Earth surface around the world could help to determine the dynamical changes of the air density in this region at global scale in real time. An interdisciplinary team of faculty at Georgia State University and University of Montenegro among others, is developing a novel tool for studying climate science on a global scale. The long-term goal of this project is to construct and deplay a network of detectors in participating institutions around the word. The data from this detector network will be used to characterize and forecast space and earth weather in real-time.

Keywords: *cosmic ray flux, detectors, muon, terrestrial and space weather, climate studies*

SOLVINT PROBLEMS OF MATHEMATICAL PHYSICS EQUATIONS OF THE PARABOLIC TYPE USING FOURIER SERIES

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ABSTRACT:
The Fourier series is a relatively young mathematical tool. However, its application in various branches of other related sciences has become so broad that a course on Fourier analysis was established in some electrical engineering and mathematics studies. Fourier analysis studies and introduces Fourier series, via trigonometric functions, describes analogies between series and transformation and integral sum. The Fourier series is the most famous mathematical tool for solving ordinary partial differential equations. In this paper, we interpreted the application of Fourier's order and methods for solving some physical problems such as: string oscillation, membrane oscillation, heat equation, three-dimensional environment problem, Dirichlet problems. More precisely, with the help of Fourier's series, we solved mathematical physics equations of hyperbolic and parabolic type. So, we solved some specific problems of mathematical physics that can be solved by other methods using the Fourier series. In the paper, we initially defined Fourier's method of separation of variables in some mathematical circles, also known as the product method. Then, for some boundary and marginal conditions, we presented certain mathematical physics problems of elliptic, parabolic and hyperbolic type in the Matlab software.

Keywords: *Mathematical physics equations, Fourier series, Parabolic type equations and application.*

FIXED-POINT THEORY IN DIGITAL METRIC SPACES

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ABSTRACT:
Banach's fixed point theorem, as one of the most important theorems of nonlinear analysis, is a very important test for solving various problems in mathematics and engineering. There are many results of fixed point theory in the literature and many of them generalize and extend Banach's contraction principle. One of the most recent applications of Banach's theorem is in image processing using digital metric spaces. In the paper, the notion of digital metric space is generalized by using uncertainty. For this purpose, various fuzzy metrics and aggregation functions were used, especially triangular norms. Our research is based on the generalization of Banach's theorem and its generalizations in generalized digital metric spaces using uncertainty with application in image processing. The properties of generalized digital metric spaces are also considered.

Keywords: *fixed point theorem, digital metric spaces, aggregation functions, triangular norm*

MEDICAL, BIOMEDICAL AND PHARMACEUTICAL SCIENCES

ANTIMICROBIAL ACTIVITY OF OS(II) COMPLEXES CONTAINING *N, N, N*-INERT LIGANDS DERIVATES OF PYRAZYL-PYRIDINE.

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ABSTRACT:
It is known that anticancer activity and antimicrobial activity are closely related. Many complexes that showed anticancer activity have also shown good antimicrobial activity. Osmium complexes are seen as great potential anticancer agents with much prosperity. Therefore, we have examined the antimicrobial activity of Os(II) complexes with N, N, N-inert ligands derivates of pyrazyl-pyridine that showed good anticancer activity. Antimicrobial activity was tested by determining the minimum inhibitory concentrations (MIC) and minimum microbicidal concentration (MMC) using the microdilution plate method for four gram-positive and three gram-negative bacteria, one probiotic, and one yeast. Gram-positive bacteria showed the highest sensitivity except for the isolate S. aureus. MIC was in the range of <3.9 to >1000 µg/mL. The highest resistance was shown by the yeast Candida albicans ATCC 10231. Os3 is distinguished from the examined complexes by the strength of the antimicrobial activity. In the activity of this complex, there are no differences in the action between Gram-positive and Gram-negative bacteria. Os3 on bacteria operates in the range of <7.8 for MIC to 250 µg/mL for MMC

Keywords: *Os(II) complexes, antibacterial, antifungal*

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METHODS FOR *EGFR* VARIANTS ANALYSIS IN NSCLC PATIENTS

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ABSTRACT:
Lung cancer (LC) is the leading cause of death in the world. NSCLC (non-small cell lung cancer) is the predominant form of LC. In the last decade, research and treatment of NSCLC are improved based on molecular analyses used for the determination of the EGFR (epidermal growth factor receptor) variants. To update the findings from the search we performed ten years ago using just the PubMed database, we recently used 3 electronic databases; Web of Science, PubMed, and Scopus. The aim was to reveal the most often used methods to detect EGFR variants for NSCLC diagnostics, as well as to see the application of new techniques in the last ten years. In the first search from 2000-2011 within 292 papers were identified as eligible, and among various methods, PCR methods were identified in 45.2%. Results from a recent search showed that among 987 selected articles published from 2010-2020 showed that PCR methods were identified in 43.43%. Other findings showed that methods such as immunostaining, hybridization techniques, and proteomics used in the 2010s have been replaced over time. The qPCR (Quantitative PCR), ARMS (Amplification refractory mutation system, or allele-specific PCR), and digital PCR have uptrend over the years. The choice of methods for clinical diagnosis depends on many factors, prevalently economic circumstances. The methods of choice for EGFR variant identification are direct DNA sequencing combined with PCR methods, although the application of next-generation sequencing and similar advanced methods is still limited in everyday clinical practice.

Keywords: *PCR, EGFR, NSCLC, lung cancer*

A COMPARISON OF THREE DOSIMETRIC PATIENT QUALITY ASSURANCE TOOLS FOR PRECISION RADIOTHERAPY OF HEAD AND NECK CANCER

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ABSTRACT:
Precise and very complex radiotherapy technique Volumetric Modulated Arc Therapy (VMAT) provides uniform and conform dose distribution. Despite that, there is still a possibility that due to precision in the dose calculation of the treatment planning system (TPS) or the errors associated with it, there can be distinctions between dose distributions which are planned and delivered. The gamma index is the parameter by which is quantified the difference between these dose distributions and this index may depend on the pathology and the area to be treated. The goal of this work is to estimate different parameters of the gamma index for head and neck cancer treatments. The analysis was based 2%/2 mm, 3%/3 mm criteria. 10 treatment plans were created with the VMAT technique calculated with the TPS Eclipse V.15.6 (Varian Medical Systems, Palo Alto, CA) and measured with the Dolphin (IBA dosimetry, GmbH, Germany), Matrixx Evolution (IBA dosimetry, GmbH, Germany) and Varian aS1200 electronic portal imaging device (EPID) were analyzed. A Varian iX clinac linear accelerator (Varian Medical Systems, Palo Alto, CA) with a 6 MV photon beam was used to deliver the dose. The obtained results of the analysis were that a gamma passing rate (%GP) greater than 95% for 2%/2 mm and 3%/3 mm analysis criteria. The criteria for gamma analysis can be less strict and then the %GP can increase. A significant difference was also observed when the PTV has a greater volume.

Keywords: *VMAT; gamma index; patient quality assurance.*

MOLECULAR DOCKING STUDY OF SELECTED NUSBIARYLINS AS POTENTIAL NONCOVALENT INHIBITORS OF SEVERE ACUTE RESPIRATORY SYNDROME CORONAVIRUS 2 MAIN PROTEASE

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ABSTRACT:
Given the fact that coronavirus pandemic is a major public health concern nowadays, there is the constant need to develop the new effective drugs against severe acute respiratory syndrome coronavirus 2. Computer-aided drug design is a time-saving efficient tool that can quickly identify new promising compounds. Biaryl compounds targeting N-utilisation substances, called "nusbiarylins" represent a group of new ribosomal RNA synthesis inhibitors with potential antibacterial activity. In this paper, we wanted to evaluate the potential of these antibacterial compounds to inhibit severe acute respiratory syndrome coronavirus 2 viral replication. The aim of this in slico study was to estimate antiviral potential of seven newly designed nusbiarylin derivatives (1-7) based on inhibition of severe acute respiratory syndrome coronavirus 2 main protease. AutoDock Vina software was used for the binding analysis of designed compounds into the active site of the severe acute respiratory syndrome coronavirus 2 main protease (PDB ID: 5RGX). Analysis of binding poses revealed that benzamide derivative 1 achieved the lowest free binding energy value of -7.1 kcal/mol, while mercaptobenzoate derivative 4 formed the highest number of significant binding interactions (six). Based on number, type of key binding interactions and docking scores, we can conclude that compounds 1 and 4 demonstrated the highest binding affinity for the target enzyme and therefore possess the best antiviral potential against severe acute respiratory syndrome coronavirus 2.

Keywords: *coronavirus 2 main protease, nusbiarylins, molecular docking, AutoDock Vina, binding analysis*

ARYLALKANOIC ACID DERIVATIVES OF NSAIDS AS POTENTIAL INHIBITORS OF MICROGLIAL ACTIVATION IN NEUROINFLAMMATION – MOLECULAR DOCKING STUDY

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ABSTRACT:
Neuroinflammation and excessive activation of microglial cells leads to the progression of different neurodegenerative diseases. The binding of lipopolysaccharide to the TLR4 (Toll-like Receptor 4)/MD-2 (Myeloid Differentiation factor 2) complex leads to activation of the nuclear transcription factor κB (NF-κB), whereby microglial cells secrete proinflammatory cytokines such as IL-1β, IL-6 and TNF-α. Based on aforementioned, inhibition of the TLR4 signaling pathway represents a good strategy in preventing the occurrence of neuroinflammation, and therefore the development of neurodegenerative diseases. The aim of the conducted in silico research was to determine inhibitory potential of six arylalkanoic acid derivatives of non-steroidal anti-inflammatory drugs (1-6), previously designed by our research group, against the TLR4/MD-2 complex. We used AutoDock Vina software for semi-flexible docking protocol to analyze binding affinity of design compounds to the binding site of TLR4/MD-2 complex (PDB ID: 3VQ2). The binding analysis of tested compounds was performed according three main criteria: number, type of significant interactions and free binding energy value. Compound 4 (2,3-dihydropyrrole amide of fenoprofen) formed the most stable ligand-protein complex with a free binding energy value of -8.7 kcal/mol. Compound 6 (piperidine amide of naproxen) achieved the highest number of significant interactions with the target protein (eleven). Based on obtained results, it can be concluded that compounds 4 and 6 have the best potential to prevent the occurrence of neuroinflammation, and thus potentially prevent the development of neurodegenerative diseases.

Keywords: *neuroinflammation, TLR4/MD-2 complex, molecular docking, AutoDock Vina*

EVALUATION OF THE BINDING BEHAVIOR OF NUDT5 INHIBITORS WITH ESTROGEN RECEPTORS: MOLECULAR DOCKING STUDY

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ABSTRACT:
The enzyme NUDT5 (nucleotide diphosphate hydrolase type 5) catalyzes the reaction of converting adenosine diphosphate into adenosine triphosphate. NUDT5 is a constitutive regulator of tumor drivers and may play an important role in breast cancer. Recent studies indicate that increased expression of NUDT5 in breast cancer patients is associated with a worse prognosis and occurrence of relapse and metastasis.
In this paper, virtual screening was conducted using a potent inhibitor of NUDT5 hormone signaling as searching query in the Swiss Similarity web tool. Compounds with more than 50% structural similarity in comparison to searching query were selected. The criteria used for the further selection of compounds were: toxicological predicted characteristics, drug-likeness properties, and substrate or non-substrate for P-glycoprotein. Using the mentioned parameters, we selected 6 compounds that were included in further analysis. The aim of this research was to simulate the binding mode of selected compounds to estrogen receptor using the molecular docking methodology and then determine the number, type of the key binding interactions, and free binding energy value. Focused semi-flexible molecular docking was performed using the AutoDock Vina software. The three-dimensional crystal structure of estrogen receptor was downloaded from the Protein Data Bank (PDB ID: 3ERT). The highest number of interactions were hydrophobic type, whereby all compounds formed contacts with Ala350A and Leu525A. The presence of hydrogen bond interactions with Glu353A and Arg394A were particularly significant. These polar interactions contribute to the higher binding affinity of tested compounds to estrogen receptors.

Keywords: *molecular docking, NUDT5, estrogen receptor, breast cancer*

RESEARCH ON THE CORRECT USE OF ANTIBIOTICS IN DENTISTRY

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ABSTRACT:

Antibiotics are chosen on a "best guess" basis, with knowledge of the infectious disease, the most likely pathogen and its usual antibiotic susceptibility profile. This type of empirical antibiotic therapy is used in most situations in dentistry because most infections are caused by multiple pathogens, anaerobic gramme-negative bacteria are most commonly involved in these infections, and it's difficult to avoid contamination of the specimen with the colonising microflora when taking samples. It's important to follow the basic principles of the correct use of antibiotics. It must be determined whether the disease has an infectious cause and if so, a sample must be taken for microbiological examination before antibiotics are administered. Several factors may influence the choice of antibiotic: medical history, allergic reactions, toxic effects of the drug and previous antimicrobial therapy. Existing organ damage must be taken into account. The way antibiotics are administered depends on the severity of the disease. For example, the parenteral, intravenous route of administration is chosen for severe infections. Interactions of antibiotics with other drugs are becoming more common due to the introduction of new drugs into clinical practise, so this factor must be considered when determining antimicrobial therapy. The over-empirical use of antibiotics has led to a tremendous development of bacterial resistance to these agents, so that today the choice of therapeutic options for the treatment of many infections is limited to less effective agents.

Keywords: *dentistry, antimicrobial therapy, resistance*

RESISTANCE OF BACTERIAL ISOLATES FROM URINE CULTURES TO ANTIBIOTICS

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ABSTRACT:
Because of their frequency, the necessary use of antibiotics and the increased costs of treatment, bacterial infections of the urinary tract represent a current and one of the most prevalent problems in modern medicine. The aim of this work was to show the main causes of bacterial infections of the urinary tract and their resistance to various antibiotics used in the treatment of these diseases. Through the bacteriological examination of urine cultures in the period from January to December during 2022, patients with the presence of bacterial infections were registered in the territory of Šabac.
The presence of bacteria was determined in urine culture, using standard microbiological methods. In order to test resistance to antibiotics, the disk diffusion method was used. In the observed period, 23,586 patients with urinary infections were registered. Of these, the largest number of isolates is Escherichia coli (59.51%), Klebsiella spp. (14.11%), Enterococcus spp. (8.97%) and Proteus spp. (7.32%). The species Stenotrophomonas maltophilia (0.04%) had the lowest representation in the urine culture. Considering that uropathogenic representatives of bacteria have the ability to develop resistance to antibiotics, it is recommended that the therapy of these infections be carried out on the basis of an antibiogram. The drugs of first choice in the treatment of infections caused by Escherichia coli are colistin, tigecycline and nitroxoline, while the majority of isolates showed resistance to ampicillin and amoxicillin. In Klebsiella spp. all isolates showed the appropriate percentage of resistance to the tested antibiotics, and ciprofloxacin and trimethoprim sulfonamide proved to be the most effective.

Keywords: *urine culture, bacterial infections, antibiotics, antibiotic resistance*

DIFFERENT RESPONSE OF BREAST CANCER CELLS TO *IN VITRO* INHIBITION WITH PLANT BIO-WASTE

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ABSTRACT:
Breast cancer is the most common malignancy in women in Europe and the United States and it accounts for 14% of all cancers. Molecular distinction seen in breast tumors engages numerous therapies to be used in the management of the disease. In addition to the conventional methods used, new solutions are still being sought, especially that triple negative breast cancer (TNBC) is still difficult to treat and has a poor prognosis. The aim of this study was to evaluate the response of ER-positive and triple-negative breast cancer cells on natural compunds, which were obtained from plants bio-waste. MDA-MB-231 and MCF-7 cell lines (both adenocarcinomas obtained from the metastatic site) were used as a model. They were treated with different concentrations of biological active compounds-BACs (10-100%), extracted from plants. As a positive control the cisplatinum was used. The safety of applied extracts was also confirmed on normal cell lines. The obtained results indicated the adventageous properties of natural compounds in the suppression of breast cancer cell proliferation. However, the response of cancer cells was different depending on surface expression of hormone receptors. There was no noticable effect on TNBC, while in ER-positive breat cancer the inhibition of proliferation and cells' growth was proved (even in the lowest concentrations). Our study is a step forward in combination of different methods that can be applied in breast cancer treatment. Nevertheless, our future research will also focus on the designing new selective natural compounds that can be used in triple negative breast cancer treatment.

Keywords: *breast cancer, natural compounds, bio-waste, plant extracts*

TECHNOLOGICAL ASPECTS OF THE TEMPORAL-SPACE VISUALIZATION OF THE DISEASE OUTBREAK VULNERABILITY ASSESSMENT MODEL

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ABSTRACT:
The course Modeling and simulation in risk management was designed with the aim of creating basic knowledge among students at the Faculty of Technical Sciences in Novi Sad, on the study program Risk Management of Catastrophic Events and Fires, in modeling, hazard, risk, exposure and vulnerability. A very important aspect of dealing with this subject is the visualization of space-time series. In this paper, we will present an innovative part of the material, created after the previous epidemic, in which students are trained to display the spatio-temporal distribution of the vulnerability assessment of disease outbreaks in the open source tool Quantum GIS.

Keywords: *modeling and simulation, risk management, hazard, risk, exposure, vulnerability.*

ECONOMY, MANAGEMENT, TOURISM AND HOSPITALITY

ON THE QUESTION OF THE ESSENCE OF OUTSOURCING SERVICES IN THE CONDITIONS OF A STABLE BALANCED REGIONAL DEVELOPMENT

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ABSTRACT:
This study is devoted to the study of the theoretical aspects of outsourcing services, by analyzing the modern definition of the concept of "outsourcing" and its classification features, as a result of which it is concluded that it is necessary to highlight its forms, which were studied in the article, and the importance of outsourcing services for sustainable balanced development of the region is substantiated. The definition of the concept of "outsourcing" has been further developed, which is distinguished by an emphasis on the transfer from one business entity to another of a number of management functions or business processes on the basis of a concluded agreement in order to optimize performance.

Keywords: *outsourcing; outsourcing services; market of outsourcing services; types of outsourcing; forms of outsourcing; development of the region.*

TRAVEL ADVERTISING IN THE BALKAN POSTERS AND DIGITAL MEDIA

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ABSTRACT:
We present the results of stylistic analysis of the Balkan travel poster and digital media. New tools for creating shapes and images, new tools and operations for colour-tonal resolution of objects have appeared. A fundamentally new type of communication has acquired its own meanings and images. The subject of the study is the advertising of cruises XX – II decade of XXI century and visualization of the tourist product in web resources. The value of scientific work lies in the theoretical generalization of the development of water travel advertising from the standpoint of visual aesthetics. The author emphasizes that travel ads should have regional imagery, attractiveness, concise and clear disclosure of the characteristics of the tourist service, original composition, non-standard perspective, contrast and harmonious colouring, ensuring the functionality of each appeal. Electronic advertising (web site, animation project, commercial, web banner, presentation) is the result of the implementation of creative, technological and organizational components of design activities to meet public information needs. The obtained scientific results deepen the idea of graphics, generalize its communicative and art-aesthetic aspects, allow the identification of new factors at the conceptual and prognostic level, and provide insight into the current state of cruise tourism ads, including its possible combination with cultural, environmental, recreational, religious, or gastronomic, and the use of the aesthetic potential of nature will promote the development of creative thinking of professionals, and improve the visual info space.

Keywords: *cruise tourism ads, travel poster, web banner, digital media, visualization.*

THE EFFECT OF DIGITAL MARKETING ON ATTRACTING NEW STUDENTS IN HIGHER EDUCATION

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ABSTRACT:
Higher education institutions today face various challenges brought about by changes in the technological, socioeconomic and demographic environment. Digitization and the technological environment, that is, the intensity of the use of technological innovations in the everyday life of students, have created numerous challenges, but also opportunities for improving the quality of education. One of the results of these changes is the oversaturation of young people with information, which has led to a situation where it is much more difficult for higher education institutions to interest them.

Keywords: *students, digital marketing, digitization, technological innovation*

APPLICATION OF ISO 9001:2015 STANDARD IN FREIGHT FORWARDING BUSINESS

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ABSTRACT:
Customer satisfaction is one of the key factors in achieving competitive advantage in freight forwarding organizations. The ISO 9000 standard series emphasizes the application of a process approach and customer orientation, and especially the measuring and monitoring of customer satisfaction. Achieving customer satisfaction is inextricably linked with achieving the goals of the quality management system (QMS). Freight forwarding business, quality improvement and customer satisfaction are related to the key processes of customs representation and transport organization. This study shows the significant aspects of QMS in the work of a freight company, through a practical example of a real business system. Recommendations are given for meeting the requirements of the ISO 9001:2015 standard, applying a process approach and choosing quality objectives.

Keywords: *QMS, customer satisfaction, process approach*

INSTITUTIONAL OPPORTUNITIES FOR FASTER DEVELOPMENT OF DIGITAL ENTREPRENEURSHIP

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ABSTRACT:
This paper analyzes the institutional possibilities for marketing digital products and services through digital channels, which represent the potential for the development of digital entrepreneurship. Special emphasis in the research was given to the creation of an institutional infrastructure that will enable digital entrepreneurship to be supported by public opinion, the tax and banking system, as well as the education and health systems in the country.
Acting in the online space, which includes businesses enabled by digital platforms for work, creates concepts relevant to freelancers and digital entrepreneurship. By combining business, knowledge and institutional opportunities, digital entrepreneurs expand the range of business opportunities in creating financial profits, while at the same time strengthening the foundations for creating new institutions and strengthening existing ones, in the sale of digital products and services to the domestic and foreign markets.
In countries with a medium level of development, institutionally supported digital entrepreneurship can create added economic value, enabling flexibility of work, which gives an opportunity for work engagement of a part of the working population that faces structural employment problems.

Keywords*: digitization, digital transformation, digital entrepreneurship*

GROWTH OF THE TRANSITIONAL COUNTRIES OF SEE BETWEEN TWO RECESSIONS

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ABSTRACT:
The transition states of SEE had a brief respite between two global recessions. After the recession in 2020 (average decline of SEE countries -5%), a period of growth followed in 2021 (7%) and 2022 (4%), so that growth estimates for 2022 would hover around 1%. The economic consequences of the global upheaval caused by the war in Ukraine are the accelerated growth of energy and food prices, supply chains are being interrupted, company debts are growing at a record high as a result of previously taken favorable loans. Since numerous countries are involved in the conflict in Ukraine, the consequences will be global and long-lasting. The research in the paper is focused on the analysis of the growth performance of transition economies of SEE, with a focus on the structural performance of the Serbian economy between two global recessions. A special emphasis is focused on the analysis of debt growth in the transition states of SEE. The methodological instrumentation is based on the structural and dynamic analysis of key indicators of the economic-financial and statistical analysis of the economy.

Keywords: *post-pandemic growth of SEE, structural growth performance, debt growth.*

THE ENTREPRENEURIAL BEHAVIOUR OF TRANSFORMATIONAL MANAGERS

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ABSTRACT:
The paper starts with a presentation of the concept of transformational management. That concept may provide a better understanding of the key attributes relevant to modern managers and their successful management of contemporary organisations. Entrepreneurial behaviour was identified as one of those attributes. In this regard, the paper further specifies what the form of entrepreneurial behaviour signifies, and the possibilities of its encouragement within the organisational context. The paper seeks to contribute not only to the theoretical clarification of the phenomenon of entrepreneurial behaviour but also to its more pronounced practical manifestation within modern organisations.

Keywords: *entrepreneurial behaviour, transformational managers, corporate entrepreneurship.*

AN EMPIRICAL ANALYSIS OF INCOME CONVERGENCE OF THE EUROPEAN TRANSITION ECONOMIES TOWARDS THE EU-15

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ABSTRACT:
After the initiation of the transition process, one of the main expectations of the European transition economies was that the process of building the market economy and integration into the European Union (EU) leads to significant increase in the living standard, as well as to catching up with the level of the income per capita achieved in developed European economies. Therefore, the question of convergence, or the possibility of reducing economic inequality is a key question for existing EU members, as well as for countries that intend to become an integral part of it. This paper analyzes the convergence of income per capita of the countries that joined the EU (CEE-11) and the countries of the Western Balkans according to the income achieved in the developed countries of the EU (EU-15) in the period from 1996 to 2020. In order to test convergence, a panel regression model was used. The results of the regression panel model show that there is no long-term convergence of the income of European transition economies in the period from 1996 to 2020 and in the post-crisis period from 2009 to 2020. On the other hand, in the pre-crisis period, from 1996 to 2008, it was proven that there was catching up with the income of developed economies in the EU-15 and reducing development disparities between European transition economies on the one hand and developed EU economies on the other.

Keywords: *income convergence, economic development, European transition economies, European economic integration*

TRENDS IN DIGITAL MANAGEMENT OF HUMAN RESOURCES IN THE HOTEL

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ABSTRACT:
Human resources in the hotel organization are of great importance and their management is a very complex activity. The impact of digitization in the field of human resources management includes employees and those who can potentially become employees. Human resource management is a process in which the organization carries out certain activities such as personnel selection, selection, training, training, guidance and control of employees, as well as many other activities, all with the aim of achieving the organization's tasks. A special part of the organization that deals with that work is human resources management. There are many functions of this management, but one of the key ones is placing the right people in the right places and keeping them. Digitization in this area of the hotel industry does not mean only the transformation and reduction of administrative tasks, but the directing of human resources to the development of their competences as well as to the transformation of the form of employment and human resource management. The transition to digital human resources management implies that the organization has, among other things, certain software that can lead an easier and more efficient process of candidate selection, training, delegation, performance evaluation, as well as feedback from employees and their motivation. Its application improves the quality of business in the hotel industry as well. In order to achieve and maintain competitiveness, successful business and to realize profitability, one must keep pace with innovations on a global level. Old business frameworks are being replaced by new ones, and this includes digitization. The aim of this paper is to highlight the importance of digitization in human resources management, and the benefits they bring to the organization in the application of new modern technologies.

Keywords: Human resources, digitization, information technologies, hotel industry.

PROFITABILITY OF COMPANIES FROM BELEX-LINE AND MONEX INDICES – DOES EFFECTIVE TAX RATE MAKE DIFFERENCE?

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ABSTRACT:
The profitability of companies from both developed and developing countries has been examined from various aspects and previous research showed numerous profitability determinants. The Republic of Serbia and the Republic of Montenegro are two developing countries with relatively low statutory income tax rates in comparison with vast majority of European countries. Statutory income tax rate in the Republic of Serbia is 15%, whereas in the Republic of Montenegro was 9% ending with 2021, but starting from 2022 is progressive (9%, 12% or 15%). The objective of the paper is to examine whether the profitability of companies included in BELEXline and MONEX stock exchange indices differs depending on whether the effective tax rate is lower or higher than the statutory income tax rate. The subject of the paper are profitability indicators and effective tax rates of mentioned companies and the research is based on the individual financial statements available at the internet sites of Belgrade Stock Exchange and Montenegro Stock Exchange. The profitability of companies is measured by return on total assets and return on equity, while effective tax rate is calculated as a relation between current tax expense and profit before tax.

Keywords: *profitability, effective tax rate, BELEXline Index Basket, MONEX Index Basket*

THE IMPORTANCE OF USING E-BANKING IN CUSTOMER SATISFACTION

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ABSTRACT:

The purpose of this study is to show what the impact of e-banking has on customer service and customer satisfaction compared to traditional services where we are used to deliver cures to banks. In recent years in Kosovo the banking system has begun to massively provide various e-banking services and I believe that most of us also have the chance to see ads and brochures within branches regarding this e-banking service. NLB Bank and Raiffesien Bank need to build as much confidence in its customers as to be safe and comfortable. I have always had to be more open with technology and closer to the customers and fulfill their satisfaction. In order to carry out this research I have surveyed the questionnaire for the customers of NLB Banks and Raiffeisen Bank, all of whom were from Prishtina, Drenas, Lipjan and Podujeva. What has been analyzed by which consumers' satisfaction with these two banks is influenced were: how often do they use e-banking; how confident they are in the e-banking service; how much does e-banking know; Does the three-day impact on banking services and e-banking deficiencies.

Keywords: *E-Banking, Customer Satisfaction, Banking Services, Tradition.*

THE APPLICATION OF ELECTRONIC COMMERCE TO SMES IN KOSOVO

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ABSTRACT:
E-comerce has enabled a competitive market, for this reason many companies are considering changing the model of doing business, in order to be as competitive as possible in the market.
In fact in a very short time e-commerce has had a very large increase. An increasing number of businesses are already offering products and services as well as communicating with their customers and suppliers via the Internet.
In developing countries, e-commerce can be seen as an opportunity for SMEs to compete with more businesses. large, as well as to have access to the identification of lower cost resources in the international market.
The purpose of this paper is to show the theoretical and practical experiences of applying e-commerce to small and medium enterprises in Kosovo.
At the beginning of this paper are presented some research questions and hypotheses which I will try to confirm at the end of the paper.
The second part presents the theoretical part of e-commerce, types of characteristics, stages, advantages and risks, while the third part presents the theoretical part of SMEs, characteristics, forms of engagement, importance and acceptance of technology by SMEs. The fourth part presents some parts from the theory of e-commerce use to SMEs in Kosovo and their importance, as well as some aspects of how E-commerce was used during the pandemic.
The results of the paper provide important information for SME development policy makers and their managers to promote the adoption of new technologies.

Keywords: *Electronic Commerce, SME, COVID-19, Internet, Customers.*

THE ROLE OF MOTIVATION IN THE MANAGEMENT OF HUMAN RESOURCES IN THE PRIVATE SECTOR

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ABSTRACT:
Kosovar businesses are not paying enough attention to the issue of human resources management. The dominance of micro and small enterprises with few levels of organization in Kosovo also dictates that there is no space for the HR department in the organizational structure of the enterprise. Most of the owners are also managers of the enterprises, and they manage the work and human resources with as much skill and knowledge as they have.
In this study, we have presented the importance of good human resource management in employee motivation with particular emphasis on the private sector, what human resource management actually is, what motivates employees to perform work, and how the elements influence of management in their motivation.
It is noted that in very few enterprises in the private sector the HR department is present, the Labor Law is not properly implemented and the current motivation of employees does not provide stability of the labor force in Kosovo. Recent flows to the outside world are the best indicator of their satisfaction with the job offer. Who is to blame? Most of the blame lies with the management of the enterprises, which is not seeing the employees as a competitive advantage, as the most valuable asset of the enterprise and is not appreciating their work, but a large part of the blame is also with the government of which, despite the existence of adequate Laws, is not properly using its instruments for the implementation of these laws. The management of Kosovar businesses must take care to create, preserve and advance the human values of employees through the use of different forms of motivation, and respect for the Law.

Keywords: *Human Resource Management, human resources, motivation, employees, private sector, salary, performance.*

THE IMPACT OF MARKETING ON THE RECRUITMENT PROCESS IN THE INFORMATION AND COMMUNICATION TECHNOLOGY SECTOR IN KOSOVO

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ABSTRACT:
There are many job openings in the field of information of communication and technology in Kosovo. ICT companies are growing fast. Most of these companies export their services abroad. In order to grow, companies need a qualified labor force. These companies are competing with each other to attract qualified labor force in the field.
The aim of this study is to explore what marketing communication practices do ICT companies apply, in order to attract the qualified labor force. What are the job attributes of vacant positions, that companies consider to be important in attracting the labor force. How do companies communicate the offer of vacant positions toward their labour market and what are the barriers to this communication.
The method used in this quality research study is Grounded Theory. Empiric data are collected from eleven deep interviews with unstructured questionaires, done with eleven ICT companies in Kosovo. Data from interviews are coded and have led to building three categories which served in answering the research questions. The three emerged categories from coded material were: Job attributes; Communication; Noise and environment
Salary, culture of company and skills of the candidate emerged as the most stressed attributes of the oppen job position. Job advertisment – as advertising; recommendation for open job position – as the word of mouth and Head-hunt method- as direct marketing and personal sale, were the mos used ways, by ICT companies, in communicating the offer for open job positions to the labor market.

Keywords: *Information and Communication Technology, Kosovo, commpetition, qualified labor force, marketing communication strategy*

CUSTOMER SATISFACTION THROUGH RELATIONSHIP MARKETING

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ABSTRACT:
Marketing and marketing management has one of the many branches to administer tire seam restriction. The prime is to identify and gain consumer markets. Marketing more than any other function I can handle with clients, and its simpler definition of marketing will get better: "Marketing is managing profitable customer relationships"
Information marketing is widely used as a useful tool for satisfying consumer satisfaction. Despite more than my idea there is some marketing research on buying information to customer satisfaction for the banking sector in our country. This study is based on an exploratory marketing search to desire in the banking sector and to better understand the views of a bank's customers against active marketing action to facilitate and satisfy banking sector customer acquisition, more of a distinction between it provide the banks that are activists in the right place and those that wait for the customers and for more than you give them the real offer.
Inductive research conducted over the last year in Kosovo has used semi-structured interviews as the main method of data collection and various observations for a supporting role. Based on primary data, this study sheds light on topics related to the implementation of Relationship Marketing. On the other hand, in-depth interviews were conducted with a number of businesses, bank clients, to find out if they were satisfied with the service. The way the bank is able to use the opportunities that come from the benefits and use of Relationship Marketing is analyzed. Qualitative analysis methods and coding techniques were used to analyze the data.
This study concludes that Banks in our country is able to implement Relationship Marketing from me the difference in strategy this depending on the usage / corporation listed. This study identifies the key factors that provide customer satisfaction. Finally, research confirms that marketing is well-known for having a role sufficient to win the loyalty of customers, businesses, and so on. Against the bank.

Keywords: *Marketing, relationship marketing, customer satisfaction,*

TRENDS AFFECTING THE EVOLUTION OF LOGISTICS AND SUPPLY CHAIN SUSTAINABILITY

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ABSTRACT: *The aim of the paper is to identify the following using secondary data sources: (1) business characteristics of green, sustainable, and circular supply chains, and (2) the impact of current trends (e.g. globalization, creation of partnerships between companies and outsourcing, expansive application of digital technologies, time savings, and the development of e-commerce) on the sustainability of logistics and supply chains. The focus of the study is to explore the relationship between corporate environmental strategies and supply chains, on the one hand, and their financial performance and global competitiveness, on the other. The evolution of supply chains in terms of their sustainability is increasingly reliant on the level of integration and digitization of their resources.*

Keywords: *green supply chain, sustainable supply chain, circular supply chain, Industry 4.0 technologies, lean strategy, agile strategy.*

VENTURE CAPITAL FUNDS AS SOURCE OF ALTERNATIVE FINANCING THE GROWTH AND DEVELOPMENT OF STARTUP COMPANIES IN THE REPUBLIC OF SERBIA

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ABSTRACT:
Startups as economic entities are characterized by a high degree of innovation, the potential for rapid and large growth, but also significant business risk, so investing in startups represents a special kind of challenge. Taking into account the growing potential of the Serbian startup innovation ecosystem and the increasing number of startups, the paper analyzes Venture Capital Funds as effective alternative source of financing the growth and development of startup companies in the Republic of Serbia. The fact that financing is one of the most significant challenges faced by Serbian startups also indicates the importance of Venture Capital Funds for the development and increase of the competitiveness of the domestic startup ecosystem, which was recognized and institutionalized in previous years through state regulation. Their business creates new ways of financing for startups, but also reduces the risk for investors, and with the global success of several Serbian startups, the increasing presence of foreign investors in the form of Venture Capital Funds is very noticeable.

Keywords: *Venture Capital Fund, startup, startup innovative ecosystem, startup financing*

RURAL TOURISM AS A DRIVER OF RURAL DEVELOPMENT

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ABSTRACT:
The article presents the material on rural tourism as one of the directions of strategic development of rural areas. It gives an idea of ecological tourism. The known principles and directions of its realization are specified. The separate direction - rural tourism is allocated. Its definition and inherent features are given. The classification of the basic signs of rural tourism is given. The possibility of participation of business in rural tourism is defined. The features, opportunities and undeniable advantages of ecological (rural) tourism in the tourism industry. The tasks of all-regional and national importance in the implementation of rural tourism program are presented. Today rural (green, ecological, agrotourism) tourism has a great potential for development. Examples and experience in the implementation of rural (ecological) tourism in the regions of Russia are presented. Identified and highlighted the strengths and weaknesses of the regional development of rural tourism. Especially promising is the development of rural tourism between Moscow and St. Petersburg. For the implementation of possible models of this type of tourism should be developed classification, standardization and training. Higher education institutions must develop standards and programs for training and retraining of these specialists of small hospitality business. These programs should be tied to the specifics of business management in rural tourism.

Keywords: *rural tourism, program, regions, experience, implementation, personnel. Russia has unique natural and climatic, cultural and historical features that allow to develop almost all popular types of tourism, one of which is rural tourism.*

SCOPE AND CHALLENGES OF ARTIFICIAL INTELLIGENCE APPLICATION IN ACCOUNTING

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ABSTRACT:
The provision of public services at a high level and the increasing exposure to the capital market condition state-owned companies, more than ever, to be under pressure to continuously improve their operations. Hence, intervention by management in presenting performance differently than they really are, and that by shaping earnings (Earnings Management - EM), are not rare. However, as manipulations of the result cause multiple negative consequences for the entire social community, the establishment and efficient functioning of Public internal financial control system (PIFC system) assumes a significant mechanism for achieving reliable financial reporting and business compliance. The aim of the authors of this paper is to examine the relationship between EM and PIFC in state-owned companies in the Republic of Serbia. The research sample will consist of 64 state-owned companies whose financial statements were audited by the State Audit Institution in the period 2018-2021. In order to identify EM, the financial reports of these companies for the period 2018-2021 will be used. Examining the relationship between EM and PIFC in state-owned companies in the Republic of Serbia primarily aims to identify the efficiency and effectiveness of PIFC in deterring management from manipulations through profit management.

Keywords: *discretionary accruals, financial management and control, internal audit, central harmonization unit, risk management*

OPPORTUNITIES FOR THE DEVELOPMENT OF E-SPORTS TOURISM IN MONTENEGRO

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ABSTRACT:
Over the last decade, the e-sports industry has experienced its boom and expansion, and it is more popular every day. Given that tourism is the central branch of the Montenegrin economy with all its thematic types, the importance of accepting new ideas and creating new development opportunities is recognized.
The tourist offer is continuously being innovated and developed, so e-sports, which keep up with the times, can contribute immensely to the sustainable development of tourism in Montenegro. Therefore, the paper analyzes the influence of this extremely popular phenomenon on the overall development of Montenegrin tourism. Therefore, the goal of this paper is to look at the possibilities of development of the electronic sports tourism in Montenegro, with all potentials and obstacles in development.
The paper includes secondary and primary research, whereby the secondary research is based on data from available bibliographic units, while the primary research is based on the processing of data collected through interviews, and refers to the collection of opinions and attitudes of employees in the e-sports industry, and related to the current situation in this area, potentials and proposals for further development of this type of thematic tourism in Montenegro, with the aim of creating an innovative tourist offer. The questionnaire was conducted on the basis of the sample method, i.e. the personal, semi-structured interview method.
This research will help in the creation and development of new tourist destination development strategies, but also in understanding the positive aspects of e-sports tourism, i.e. gaming tourism.

Keywords*: e-sport, gaming tourism, selective types of tourism.*

BRANDING OF BELGRADE NIGHTLIFE'S ORGANIC CAPACITY

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ABSTRACT:
City branding has become a popular area of research in spatial sociology, as a result of global urbanization of society, as well as a new phase of capitalism. Belgrade has enjoyed the title of the capital of nightlife of Eastern Europe for over a decade, and that "new Berlin" image was cretead completely organically - with no strategy, promotion, urban management, or even a clear plan on the part of tourist organizations. This paper aims at examining the potential and posibilities, as well as problems and potential hurdles on the path of building on, and highlighting the aforementioned potential, provided that a longterm plan and a strategy to promote and brand the city was put into effect. It will explore how taking these steps would affect the overall improvement of the city, its tourism and economy, as well as the impact they would have on the fulfillment of the socio-cultural needs of its inhabitants. The goal is to examine the general traits of city branding as well as the popularity and relevance of Belgrade nightlife, for tourists and migrants, as well as the local population, and eventually provide a concrete branding process plan. This entire process would consist of detailed analysis, research, interviews, as well as the mapping of current hotspots credited with creating this image of Balkan nightlife epicenter. Finally, it aims to develop a branding and development vision, utilizing all the modern instruments for urban management, and therefore secure Belgrade's competitive advantage on the market.

Keywords: *Belgrade, branding, city, nightlife, urban management*

EVALUATING INTANGIBLE PROJECT MANAGEMENT ASSETS: EMPIRICAL EVIDENCE IN SERBIAN CONTEXT

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ABSTRACT:
Project-based firms have a wide range of tangible and intangible resources, while a significant share in the total value of the company has intangible assets. Traditional accounting standards are not sufficiently effective in determining created value in the era of knowledge and digitalization. Digitalization has contributed to numerous challenges, among which is the repositioning of the role of human intellectual potential in the value creation process. The automation and artificial intelligence are recognized as a widespread and central component of modern factories as well as the most important driver of technological change in society. Despite the benefits of using robots and machines, humans are still considered an irreplaceable component, and the success in the digital economy is largely determined by intangible assets. Considering limited empirical studies in project management, the purpose of this paper is to assess intangible project management assets, using project managers' perspective. The intangible project management assets is explored in terms of human, structural and relational capital. The findings reveal that the relational capital has reached the highest level of development in analyzed project-based firms. The conducted research is a good starting point for the development of value creation model in u project-based firms. The findings imply the potential space for the improvement of intangible project management assets, as an important element in value creation process. The future research may be focused on exploring intangible project management assets form the point of view of other project stakeholders, which can be used in comparison analysis.

Keywords: *project managment, intangible assets, project-based firms*

MERGERS AND ACQUISITIONS AS A VALUE CREATION OPPORTUNITY IN ECONOMIC UNCERTAINTY

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ABSTRACT:
Significant and unpredictable instabilities in the value of companies and the possibility of mergers and acquisitions represent a current global research problem. This paper analyzes the process of mergers and acquisitions as an opportunity to create value in times of global economic uncertainty. The paper aims to present relevant theories and concepts through a theoretical framework by analyzing previous research on M&A. Also, the most notable cases of successful and unsuccessful global M&A and the importance of diversification will be discussed. Furthermore, strategic, financial, and managerial motives for M&A, their evolution, value creation and measurement will be analyzed. In addition, the possibility of future M&A will be discussed.

Keywords: *M&A, mergers and acquisitions, value creation, diversification.*

ACQUA ALTA AS TOURISTIC AND MEDIA SPECTACLE OF VENICE

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ABSTRACT:
Venice is a city in northeastern Italy located on a group of 118 small islands separated by canals and connected by bridges. The economic system and the mere existence of Venice have always been based on water. Water meant shelter, safety, nourishment, wealth, military strength and breath-taking views of spectacular sceneries from the bridges of Venice. The canals and lagoon are its main features and they give the city a relaxed and unique atmosphere. On the other hand, the destructive power of water also present the biggest enemy of the city's infrastructure. This paper discusses a problematic phenomenon named Acqua Alta that has been affecting Venice for centuries and its influence on the creation of scenic space and its perception. The aim of this paper is to analyze Venice as a scene of tourism and media spectacle during the disasters unique to this fascinating world surrounded by water. The problem of the research is the change in the perception of the city at the moment when an event occurs, more precisely the change in the very meaning of the city space when the event is experienced. This creates a hypothesis, that the change of the city space that we witness through our eyes (live or in the media) affects the formation of the scenic character of the city.

Keywords: *city, spectacle, tourism, Venice, acqua alta*

HUMAN RESOURCES MANAGEMENT IN THE FUNCTION OF MORE EFFICIENT OPERATIONS OF BANKS

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ABSTRACT:
In today’s business world, employees are an important resource, on which development of every business system is based, including commercial banks as well. Modern business systems, of different legal forms, which functioning happens according to the market principles, understand the importance of the employees i.e. human resources, as the decisive factor of creating and managing competitive advantages. Due to that fact, in the process of hiring their employees, those systems are focusing on candidates which have the qualities to meet the requirements and standards of the company; above all in meeting the qualitative and quantitative objectives of the company, in terms of the team work skills and ability to adjust themselves to changes.
This is the reason, why the staff hiring i.e. human resource policy in the modern business era is one of the key factors of a company’s success and a disired characteristc of the company. Hence, hiring (selection) of employees becomes an important topic in the organizational theory.
Taking into account that the human resources are an inevitable factor of every company’s success, including banks, and that in the modern business world exist, both scarce resource and more complex requirements of the employers, the objective of this paper is to check and define the role of human resources in the company and how the adequate management of the human resources in the company influences the development of the commercial banks.

Keywords: *management, human resources, bank, operations*

COMPETITIVENESS OF THE REPUBLIC OF CROATIA AS A TOURIST DESTINATION AND COMPARISON WITH MONTENEGRO

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ABSTRACT:
The competitiveness of a tourist destinations can be monitored through the constant growth of statistical data on the number of tourist arrivals and overnights, as well as the growth of the national gross domestic product caused by the growth of traffic in the tourism system. For this reason, competitiveness becomes a key concept of approach and research in this article.
Over the years, indicators have been developed by various organizations that deal with certain aspects of competitiveness, but an overall framework for measuring competitiveness in tourism is still missing. It was concluded that it is actually difficult to standardize an ideal set of indicators, therefore the measurement of the competitiveness of tourist destinations should be approached as a systematic process.
This article will present and analyze secondary data collected from The Travel & Tourism Competitiveness Reports of the World Economic Forum, publication Tourism in figures published by the Ministry of Tourism and Sports of Republic of Croatia and TOMAS - attitudes and expenditures of tourists in Croatia reports by the Institute for Tourism Zagreb and compare it with secondary data on tourism traffic in Montenegro. The aim of the paper is to determine the competitiveness of two tourist destinations by comparing statistical data that measure national tourism competitiveness from various reports and to assess the value of selected indicators as important elements in the creation of the future models for systematic monitoring of competitiveness.

Keywords: *indicators of competitiveness of tourist destinations, measurement of competitiveness*

SPECIFICITY OF BUSINESS OF HOTEL COMPANIES IN MONTENEGRO

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ABSTRACT:
The importance of tourism for the economic and social development of Montenegro gives special importance to the business of hotel companies in our country. Bearing in mind that the hotel industry is one of the significant generators of tourism growth and development, and that despite this fact it is not recording the expected results, in this paper we will focus on the potential reasons for such a situation. At the same time, we will analyze the specifics of the business of hotel companies in our country as well as the peculiarities of the hotel business, all with the aim of providing possible answers to the present dilemmas and pointing out some of the possible solutions.

Keywords: *tourism, analysis, profitability, hotel industry*

MODERN TENDENCIES IN TOURISM

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ABSTRACT: *Development of modern tourism is affected by rapid and continuous changes of tourism demand. Tourist offers that are being put out on the market have a task to constantly adjust to newly-created challenging situations on tourism market. Modern technologies, primarily internet, have changed the methods of operating and have enabled already existing, as well as potential users of tourist services to have easier and quicker accessibility of necessary information.*
Already existing selective types of tourism have been overtaking spots on the dynamic tourist market, while new selective types of tourism are being affirmed, in accordance with innovative and previously researched wishes and tourist demands. As a result of modern technologies, modern buyer on tourism market is becoming more demanding. Distribution of information across the world, promotion and other marketing activities are simplified by using online options that digital era brings. This work will indicate what kind of changes the digital era brings, drawing a parallel between traditional, mass tourism and selective types of tourism.

Key words: *digitalization, modern trends, selective types of tourism*

ASSESSMENT OF DIGITAL ECONOMY AND SOCIETY INDEX (DESI) DIMENSIONS USING MCDM METHODS

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ABSTRACT:
The concept of a digital economy has recently been developing due to the multiple and dynamic nature and transformations of digital technologies. The digital economy is the most important global driver of innovation, competitiveness, and growth. For Europe and business entities that operate in its market, digital technologies are key determinants for their further economic development. Hence, this paper aims to analyze and compare two clusters, European countries (EU-27) and Southeast Europe non-EU countries (SEE-5), according to indicators of four key dimensions of the Digital Economy and Society Index (DESI). For this analysis, data from the Eurostat database have been applied. The ranking and selection process of European countries was carried out application of the multi-criteria method EDAS (Evaluation Based on Distance from Average Solution). The result obtained from the EDAS method shows consistency with that generated using the TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) method. This paper extends existing studies by focusing on applying a broad range of indicators regarding DESI dimensions and shows the level of digitization's process application. The results provide valuable insights into evaluating the technological progress in European countries individually.

Keywords: *Digital Economy and Society Index, MCDM methods, European countries ranking, EDAS, TOPSIS*

THE ACQUISITION OF INTERCULTURAL COMMUNICATION AND COMPETENCE OF TOURISM MANAGERS

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ABSTRACT:
The subject area of intercultural communication and competence is large. The aim of this work is to give a comprehensible overview of the relevant aspects of intercultural competence. Globalization and internationalization have progressed with increased intensity in recent years and the increase in international business activities will remain an unbroken trend in the 21st century.
The present work deals with the acquisition of intercultural communication and competence of tourism managers at the Faculty of Tourism and Hospitality in Ohrid. The acquisition of intercultural competence is presented as the ability to easily and respectfully communicate and work with tourists from other cultures - is therefore a highly sought-after quality in the tourism job market. As part of the course, intercultural communication and competence are first defined and future tourism managers are taught from various perspectives that cultural competence - is the decisive component of international competence - forms the basis for intercultural knowledge transfer. Intercultural communication and competence provides the opportunity to build lasting business relationships, which give tourism managers a competitive advantage over threatened competition.
Intercultural competence is therefore a decisive success factor in tourism and is becoming more and more important for tourist working life and is therefore increasingly required by employers. Intercultural competence of tourism managers is a prerequisite for integration, because it helps to eliminate misunderstandings and promotes sensitivity, understanding of other cultures and personal development.

Keywords*: intercultural communication, intercultural competence, foreign languages, tourism manager, teaching*

MANAGIING THE CHANGES IN OHRID'S HOTEL OFFER THROUGH BOUTIQUE HOTELS

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ABSTRACT:
Ohrid is the most attractive tourist destination of the Republic of North Macedonia. With its natural and anthropogenic values, it has always been interesting and attractive to tourists, especially foreign visitors. The characteristics and beauties of Lake Ohrid, the cultural-historical heritage as well as the natural, environmental and ethno-social motives are factors that make Ohrid the largest and most famous tourist center of the Republic of Macedonia. Against the significant tourist values, the content of Ohrid's hotel offer is not set as a factor for increasing its competitiveness on the international tourist market.
In this context, changes in the hotel offer are necessary. Managing changes through an innovative approach to the establishment of boutique hotels is a significant strategic direction towards the improvement of hotel services in Ohrid.
Starting from that, this paper will carry out a theoretical and empirical investigation of the concept of boutique hotels and three basic aspects related to them: the brand, the formation of an appropriate organizational structure and the communications that employees make with each other and with guests. For this purpose, an analysis of these elements will be carried out in the SU hotel, one of the most renowned hotels on the Ohrid Riviera. Through the use of the survey technique, emphasis will be placed on researching the suitability of human resources in the hotel, their loyalty to hotel activities and the satisfaction of working in the hotel.

Keywords*:* boutique hotel, hotel offer, Ohrid, organizational structure, hotel workers

IMPORTANCE OF EVENT TOURISM WITH THE EXAMPLE OF TENNIS ASSOCIATION OF MONTENEGRO

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ABSTRACT:
Pursuant to the requests of modern tourists, different selective forms of tourism occur, among which there is event tourism. Event tourism unequivocally contributes to increase in volume of tourist demand. Tourist destinations tend to develop event tourism with the aim in achieving multiple effects, such are: extension of tourist season, improvement of necessary tourist and sport infrastructure, creation of positive image of destination, etc. By studying history of sport, as well as sport events, we can determine that sport events played an important role in development of society, tourist destinations in particular. Tourist and sport workers recognizing the importance of sport events managed to establish great industry of sport events from seemingly small sport event.
Role of tennis in tourism does not represent merely factor for improvement of tourist offer but also generator of additional economic effects. By including tennis into the tourist offer of Montenegro, an assumption is made for the long-term successful appearance of destination at the demanding tourist market. By their studious work, tennis enthusiasts in Montenegro, at the annual level, organize over 80 tournaments. It is important to highlight that these tournaments are already firmly established within Calendar of competition of Tennis Association of Montenegro, as well as Calendar of International Tennis Federation ITF, that is ETA. All tournaments are sustainable, which represents best recommendation for multiannual, that is traditional organization.

Keywords: *sport tourism, sport event, tennis, economic effects, calendar of tournament*

NEUROMARKETING RESEARCH AND ITS APPLICABILITY IN THE EFFECTIVE ADVERTISING STRATEGY

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ABSTRACT:
Neuromarketing research has emerged as a promising field for developing effective advertising strategies. This approach involves the use of different technologies such as brain imaging, eye tracking, facial coding in order to understand consumer behavior and preferences. By analyzing various stimuli, marketers can gain insights into how consumers make purchasing decisions. This abstract presents an overview of neuromarketing research, state of the art technologies, and its applicability in developing effective advertising strategies. We review several studies that have used neuromarketing techniques to develop successful advertising campaigns, and deployed AI based technologies (MojoAI) to address the challenges in creation and testing of one University campaign. In the present study we have tested the correlation between sentiment within different age groups in comparison of two different campaigns dedicated to the student programs enrollment. Furthermore, we discuss how neuromarketing techniques such as sentiment, gender, face coding, age cohorts, and AI can be deployed in marketing strategy creation and campaign testing. By understanding how the brain processes information, marketers can create ads that are more engaging, memorable, and persuasive than traditional advertising methods. This abstract highlights the potential of neuromarketing research to revolutionize the field of advertising by providing insights into consumer behavior and preferences that were previously unattainable through traditional research methods.

Keywords: *neuromarketing, AI, marketing campaigns, management*

HOFSTEDE'S DIMENSIONS OF NATIONAL CULTURE IN THE FUNCTION OF IMPROVING ENTREPRENEURIAL ACTIVITIES

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ABSTRACT:
In the modern business environment, entrepreneurial activities are gaining more and more importance. Entrepreneurship and entrepreneurial activities strongly affects the economy of every country. They should be adapted to the modern business environment. Entrepreneurs are the bearers of entrepreneurial activities. Although practice shows that entrepreneurs have universal characteristics, certain variations can also be observed in individual entrepreneurs. Variations, for the most part, appear due to the different national cultures from which the entrepreneurs originate. The connection between entrepreneurial behaviour and national cultures is determined by the framework of the dimensions of national cultures established by the scientist Geert Hofstede. This work aims to provide, through Hofstede's dimensions of national culture, a theoretical presentation of the most significant characteristics that influence the development and improvement of entrepreneurship. In this context, the influence of national culture on entrepreneurial activity is analyzed.

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

DEVELOPMENT OF FINANCIAL REPORTING IN THE FUNCTION OF PUBLIC SECTOR MANAGEMENT

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ABSTRACT:
The current trend of change at the global level in the political, social, economic and institutional spheres could not remain without influence on nation states and thus on the public sector. All these new conditions, phenomena and events define the new environment in which the state or the public sector operates. There is no possibility for the public sector to avoid trends and not react to changes in the environment. Any change in the environment, to a greater or lesser extent, requires public sector management to find a socially, economically and politically adequate and sustainable way to adapt.

Key words: *public sector, environment, accounting, reporting*

BUSINESS AND VIRTUAL INCUBATORS AS INITIATORS OF ENTREPRENEURSHIP DEVELOPMENT

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ABSTRACT:
The main goal of starting business and virtual incubators is appropriate infrastructural support in the process of establishing and developing new small and medium-sized enterprises, based on innovative or entrepreneurial ideas and start-up projects, both at the local and national level. Business incubators have established themselves in developed countries, but also in those in transition, as a reliable means of supporting the development and growth of small and medium-sized enterprises, and then, even regional development at the national level. The development of information and communication technologies leads to the launch of an increasing number of virtual incubators as a new way of contracting business cooperation and expanding the network of business clients. The subject of research in this paper is the analysis of the justification of organizing entrepreneurial and virtual incubators in Montenegro from the aspect of technical, commercial, economic and other parameters that are needed to check the sustainability of the project in the long term, in which the only possible full effectuation of the engaged resources. The goal of the research is to investigate the feasibility of the proposed development variant of future entrepreneurial incubators, which should represent important infrastructural support for the development of new and entrepreneurial ventures in the initial stages of their development.

***Keywords**: business incubators, start up, virtual incubators, entrepreneurship, innovations.*

THE INFLUENCE OF MARKETING ACTIVITIES ON THE BRANDING OF SPORTS

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ABSTRACT:
As a rule, the subject of research is some, specific connection between phenomena. With that, the determination of the subject includes the determination, that is, the definition of the very phenomena between which the connection is established, as well as the determination of the nature of the connection itself. The subject of the research is branding as an important factor of successful development in sports. Special attention was paid to FC Crvena zvezda and its brand. Theoretical definition of the problem and the subject of research is a logical operation by which the essence of the phenomenon to be investigated is determined using abstract terms. Operationally, the working definition of the problem consists in the determination of indicators, that is, indicators that can be empirically tested and verified. The degree of research into branding in sports is high, and given that marketing is an increasingly influential and prevalent area of the economy, that degree of research into branding in sports will grow to an even higher level over time. After the operational definition of phenomena is carried out, assumptions or research hypotheses are set. Their function is to assume a connection between the phenomenon we are investigating and other factors that could be assumed to be in some kind of relationship with it. The aim of the research is to check the validity of the hypothesis.

Keywords*: internet marketing, marketing, campaign, SD Crvena zvezda*

HIERARCHIES, KNOWLEDGE, AND POWER INSIDE ORGANIZATIONS IN PROJECT MANAGEMENT

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ABSTRACT:
Purpose – In project management, hierarchies, knowledge, and power play important roles in determining how decisions are made, how information is shared, and how work is accomplished. After the pandemic crises remote working changed the key points to consider.
Design/methodology/approach –The research items are questioned according to the theoretical framework. A literature review and bibliometric analysis is conducted
Findings and Conclusion – Overall, the COVID-19 pandemic has led to significant organizational changes that are likely to have a lasting impact. Organizations that are able to adapt to these changes and remain agile and flexible are likely to be more successful in the long term.
The COVID-19 pandemic has led to significant organizational changes that are likely to have a lasting impact. Here are some key changes that organizations have experienced:
Remote Work: The pandemic has forced many organizations to adopt remote work policies, which has led to a significant shift in the way work is done. Remote work has become more accepted and commonplace, and many organizations are likely to continue to offer remote work options even after the pandemic has subsided. This will require changes in the way teams are managed, communication is facilitated, and productivity is measured.

Keywords: *hierarchies, knowledge, power, project management*

LEGAL AND POLITICAL SCIENCES, SOCIOLOGY, PSYCHOLOGY

HANDING OVER THE CHILD AS AN ACTION FOR IMPLEMENTATION OF EXECUTIVE PROCEDURE

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ABSTRACT
Enforcement by handing over the child in the enforcement procedure represents a reflection of the unfulfilled obligation that results from the content of a specific final court verdict. In this paper, the authors will analyze the execution procedure by handing over the child, as well as the conditions for such a procedure as an enforcement action. In addition, as an important actor of that procedure, the role of the guardianship body will be analyzed, that is, the importance of the role of the guardianship body in relation to the position of the child in such circumstances. The importance of determining the best interest of the child will be pointed out, which is a right that should be the guiding principle for all participants in such a procedure. In addition, the problems that can arise and further complicate the procedure of implementing the enforcement action in question, i.e. the action of handing over the child in the enforcement procedure will be pointed out as well. According to the possible obstructions related to the implementation of the execution, the possibility of an initiative to use a legal sanction for the party that prevents the implementation of the procedure by handing over the child will be analyzed.

Keywords: *child, executive procedure, guardianship body, Convention on the Rights of the Child*

MONTENEGRO AND OPEN BALKAN – ECONOMY OR POLITICS, EUROPEAN OR REGIONAL INTEGRATIONS

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ABSTRACT:
The paper analyzes the Open Balkans initiative from the side of Montenegro, as a candidate country for membership in the European Union, as well as the impact of the country joining this initiative on the integration process. Also, The paper will analyze the economic benefits of joining this initiative and will provide a comparative analysis of the economic effects of joining the Open Balkan initative and the EU. Also, the analysis will provide an overview of the state of all the countries of the Western Balkans in the part of the EU negotiations, with the special focus on the chapters and progress in the integrations, and an analysis of the current state of regulatory compliance that is necessary to be accepted in the part of participation in the Open Balkans, as well as potential problems that may be caused in the economic and regulatory processes of Montenegro on its way to the EU. The analysis will present the advantages and disadvantages of joining the mentioned initiative, with a special focus on economic parameters and the development of economic activity in Montenegro.

Keywords: *Open Balkan, European integration, Montenegro, economic integrations, regulation*

LABOR LAW AND SOCIAL ASPECTS OF DISCRIMINATION OF WOMEN IN EMPLOYMENT AND WORK

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ABSTRACT:
The paper analyzes discrimination in general, with regard to the severity and quantity, especially from the aspect of discrimination against women in employment and at work, during the employment relationship. Through the prism of international and domestic documents, laws and bylaws that deal with discrimination, the subject of work will be legal and social practice, which indicates the severity of discrimination, especially in the process of hiring and exercising rights from work. It is assumed that the discriminatory position of women in employment and work is influenced by numerous legal and other social factors. It is also assumed that discrimination against women in the labor market is the result of women's social position and negative perceptions of their social role, for which there are still established discriminatory attitudes and prevailing opinions that a woman should be a good housewife and mother. For this reason, there is a need to change the image of women, who have the right to affirmation through work, which is still unthinkable for a certain part of the population.

Keywords: *gender discrimination, the position of women, work and employment*

PERSPECTIVES OF HUMANISTIC EDUCATION IN THE CONTRASTS OF MODERN SOCIETY

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ABSTRACT:
The basic thesis of the paper reflects the criticism of the characteristics of consumer society i.e. negative consequences of the mass culture which, directly or indirectly, interfere with the educational dimension of school but they obviously improve the environment emphasising the education model in which the competences projected by the labour market and capital are crucial. As the target of the interest, we recognise dominantly materialistic version of the world in which the author sees numerous reason for pessimism regarding the prediction of humanistic orientation and the perspective of education process. In one of 6 chapters this dominant opinion is supported by numerous examples of increased school violence, decrease in authority and motivation, disregard of traditional models and general value system disorder.

Key words**:** *Humanistic education, mass culture, destruction*.

EXTRA-DUTY EMPLOYMENT OF POLICE OFFICERS

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ABSTRACT:
The police is structured from different organizational units where police officers work with numerous specializations. The skills of police officers derived from these specialized jobs are becoming an interest in the private sector as well. It becomes evident that the police community cannot prevent that interest, and if we add to that the continuous need for greater security and the need of police officers for additional income, then solutions should be devised that will try to reconcile public and private interest. In this paper, the authors aim to elaborate on foreign experiences, the nature, need and process of engaging police officers in the private sector, which includes the private security sector, while respecting the regulations governing this matter. Models of employment of off-duty police officers are presented, the challenges that arise in doing so, the mechanisms of private interest control, as well as the possible balance between the aforementioned interests. Ultimately, it is in the interest of the community to hire police officers whose participation guarantees the strengthening of overall security services.

Keywords: *private, police, models, off duty, extra work*

ACTIVITIES OF THE MANAGEMENT OF PENAL INSTITUTIONS IN THE TREATMENT OF CONVICTED PERSONS THROUGH WORK ENGAGEMENT

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ABSTRACT:
While serving a prison sentence, the treatment of convicted persons is most often applied through work activities. Work engagement of convicts is one of the essential preconditions for resocialization as a purpose of punishment. The purpose of the work is for the convict to acquire, maintain and increase his work skills, work habits and professional knowledge in order to provide him with the conditions for successful reintegration into the social environment after serving his prison sentence. For this reason, the prison management must take all measures to enable the work engagement of the convict population. The employment of convicted persons is organized in tasks of common interest for the life and work of convicted persons in the penal institution. In addition to the effect of resocialization achieved by employment, it is very important to highlight the economic effect of convict work. During the time of employment, convicted persons also receive a certain monetary compensation, which is provided for by law. The income generated as a result of work engagement of convicted persons while serving a prison sentence belongs to the institution and these funds are invested in improving the standards and conditions of stay of convicted persons in the institution.

Keywords*: convict, prison, management, employment, resocialization.*

HUMANITIES: PHILOSOPHY, PHILOLOGY, HISTORY, THEOLOGY

MOTIVATION IN LEARNING ENGLISH AS A SECOND LANGUAGE: CASE STUDY - FACULTY OF MANAGEMENT HERCEG NOVI

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ABSTRACT:
Foreign language acquisition is rather young scientific discipline. It is theoretical research area on one side and experimental one on the other, tending to improve understanding of development of all those languages that are not first acquired, or mother tongue, regardless of the manner of their acquisition or context of it. In acquiring foreign language, individual differences among students are considered to be rather important, and beside learning strategies, motivation is considered to be one of the most important ones. This paper, apart from certain theoretical considerations of motivation in learning language, also presents a case study encompassing research based on the survey conducted among students of the Faculty of Management Herceg Novi and provides certain recomendations regarding improvement of motivation to acquire English as a foreign language.

Keywords: *foreign language acquisition, English language as a second language, motivation, motivation in language acquisition*

STUDENT ACTIVISM IN THE COMMUNITY - THE ROLE OF THE UNIVERSITY IN THE DEVELOPMENT OF CIVIC ACTIVISM

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ABSTRACT:
Universities have been carriers of social change for centuries, and today the repertoire of university roles expands and becomes more complex than ever before. The social community and the university must not exist separately, but only in coexistence, taking into account the depth and levels of (co)relations achieved. Education of socially active citizens is a goal of higher education in Serbia. Youth activism means the culture of youth participation at different levels and in different areas of social activities with the aim of raising the level of awareness on necessary participation of young people in social events and deciding on important social issues. Youth activism offers young people the opportunity to take an active part in the society that surrounds them, as well as to contribute to a better and more humane society developing their competencies and interests.
Representatives of the humanistic theory emphasize the process of personal development of an individual, as well as learning through discovery and research, through one's own activity in which the individual is free to develop skills and knowledge necessary for life and work in general. It is important to emphasize that through activism students acquire both cognitive and socio-emotional skills that are less represented in our formal education. It is necessary to empower individuals to control their education process by developing their skills in order to be more successful tomorrow in the profession they want to pursue and be more competitive in the labor market.
The paper provides an overview of the research that can be used as a starting point for a more responsible role of our universities in the development of civic activism. It is necessary to have a closer connection between formal, non-formal and informal education, in order to provide holistic education to students and promote activism in the community.

Keywords: *activism, the role of university, education, students*

INTEGRITY ADVISOR IN THE PUBLIC ADMINISTRATION: HANDLING A REPORTED INCIDENT OF SEXUAL HARRASSMENT

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ABSTRACT:
Sexual harassment at the workplace describes a serious social phenomenon. As an unwanted and oppressive behaviour, sexual harrassment constitutes gender discrimination, offends human dignity and can equally affect men and women.
The role of an Integrity Advisor (IA) in public administration is to support employees, to inform the personnel of an organization and to advise managers in relation to cases of ethics and integrity.
The IA must communicate with empathy, seek dialogue to understand the situation of the other, and provide calm and confidence so that the person who reports sees not only the problem but also the solution.
In this sense, the integrity advisor constructs himself as a model human being, equipped with special abilities and skills in order to carry out his/her mission.
This paper approaches the role of the IA in public administration in the case of a reported incident of sexual harrassment in the workplace. The paper focuses on the interview, as one of the basic tools available to an IA for exercising his/her duties.
In this context, the necessary preparatory actions for the interview are analyzed, as well as the categories and examples of questions that can be asked in the case of reporting sexual harassment in the workplace.
The aim of the above is to enrich the already existing literature on the subject, as well as to highlight the importance, but also the complexity of the IA's role in its practical dimension.

Keywords: *Integrity Advisor, Interview, Sexual Harassment, Skills, Workplace*

A (POTENTIAL) LIFESPAN OF A METAPHOR: THE CASE OF A *BANK*

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ABSTRACT:
The paper examines the possibility of certain metaphoric expressions starting out as interpretative use of language and becoming a descriptively used unit by means of reutilization and routinisation. The aim is to illustrate this process by using one example – lexeme bank *– and elaborating how a certain metaphorical mapping can become routinized within a group or a community. Theoretical framework used in this paper is Relevance Theory, a cognitive-inferential model of pragmatics. Two approaches to metaphoric expressions are taken into consideration – explicature analysis (descriptive approach) and modified explicature analysis (interpretative approach). The main idea is to illustrate the process of utterance interpretation when the lexeme* bank *is used metaphorically, both as a case of descriptive and interpretative language use.*

Keywords: *metaphor, ad hoc concept, interpretative use of language, descriptive use of language, truth-conditional contribution*

STUDENTS' PERCEPTION ON FEMININE NOUNS DENOTING PROFESSION

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ABSTRACT:
The paper examines perception of students of social studies of the University of Montenegro on necessity of existence and use of feminine nouns for professions and professional titles. Upon critical review of former linguistic interpretations of disputed formative models of feminine nouns denoting female performers of actions, that is holders of professions and professional titles, authors analyze standpoints of students on this matter, and conclude perception of use of referential social feminines pursuant to determination of respondents regarding the form of masculine and feminine gender in neutral and specific usage situation. Data in this paper will be processed by the methods of descriptive statistics, and in certain instances Pirson's $\chi 2$ (hi-square) test will be used, by which examination on statistically important connection between two observed variables will be examined.

Keywords: *feminine nouns, perception, students, Montenegro*

WAY OF THINKING AND SKILLS AS CHALLENGES IN A TURBULENT BUSINESS ENVIRONMENT

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ABSTRACT:
Earthquakes caused by functioning in a turbulent environment require organizations to respond in a timely manner, become resilient and build tools that will help them go through the process of transformation, survive and even flourish in what we call the permacrisis. How to re-innovate business, processes, business model, brand, if we take into account that a lot changes with modifications in the environment? How to respond to the demands of consumers, employees, suppliers, business partners, the community and the growing competition? How to create a blue ocean of creating additional values for new consumers? We hear more and more terms like resilience, re-innovation, agile leadership, co-creation, collaboration, lifelong learning which rely on new models and skills necessary for managing a team and organization in the first half of the 21st century. The paper analyzes the way of thinking and skills needed to progress in a world of insecurity that should assist employees and leaders in solving modern and everyday challenges.

Keywords: *re-innovate, business model, added value, co-creation, lifelong learning*

AN ETHICS FOR EMERGING TECHNOLOGIES

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ABSTRACT:
In a world of rapid development of technology innovations the concept of ethics plays a key role in determining how to avoid undesirable outcomes of technology dissemination. It becomes increasingly difcult to understand the ethical implications of our use of technology. This creates problems boath for practitioners and regulators. The increased use of digital technologies in almost every field of human activities worldwide indicates complexity of the research problem. Paper disscusses ethics in technology and deals with relatively unexplored field. To fill this gap in the literature, besides dealing with etics in technology paper indicates problem of its proliferation. First part of the paper introduce ethics as general object of study. In the second part of the paper are shown different types of ethics. The rest of the paper deals with the emerging technology and ethical challenges. This study could provide valuable insights for a debate on the ethics in technology. It is important for furthering scientifc progress.

Keywords: *ethics, emerging technology, ethical challenges*

THE INTERWEAVING AND CROSSINGS OF HISTORY AND FICTION IN POSTMODERN LITERATURE: FOWLES'S *THE FRENCH LIEUTENANT'S WOMAN* AS A REVISIONARY HISTORICAL NOVEL

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ABSTRACT:
The aim of this article is to underline the relationship of history and fiction in the postmodern revisionist historical novel, with particular reference to John Fowles's The French Lieutenant's Woman. *The starting hypothesis, by contrast with Fowles's claim that this novel does not belong to the genre of historical novel, is that history and its entanglement with fiction is one of the major motifs of* The French Lieutenant's Woman. *The first part of the paper offers a brief overview of the interweaving and crossings of history in fiction from Aristotle to the present moment. However, the article argues that the interrelationship of history and fiction becomes problematic in postmodern literature, especially with the creation of the revisionist historical novel in the 1960s. This kind of historical fiction brings to the fore blurring of genres and crossings of limits, which is a prominent feature of postmodern literature. Starting from the observation that the wide scope of the revisionist historical novel should not be reduced only to the genre of historiographic metafiction, the article offers evidence that Fowles's novel rather falls under the category of metahistorical novel. This kind of novel deals with the redefinition of historical consciousness in contemporary time and aims at linking the past not only with the present, but with all time periods. In doing so, it deals with eternal, universal topics that are interesting both in the past and in the present, which is one of fundamental concerns of* The French Lieutenant's Woman.

Keywords: **:** *history, fiction, revisionist historical novel, metahistorical novel*

MULTI-FACETED IRONY IN KAZUO ISHIGURO'S *NOCTURNES*

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ABSTRACT:
In this paper, Kazuo Ishiguro's collection of short stories Nocturnes *(2009) is interpreted via a methodology sourced from theories of irony as a multi-faceted literary (meta)trope. Poststructuralist and psychoanalyst literary theories ground the elaboration of irony. Ironic discontinuities perceived in Ishiguro's short prose involve levels of narrative discourse, cultural ideology, and structure of genres. Results expose a relativist worldview based in affect, methods of consoling self-delusion, and a tragic conformism to an increasingly virtual and commodified social reality. The significance of this research lies both in the formulation of an operative interpretative framework and in the analysis of Ishiguro's rarely explored genre of short stories.*

Keywords: *Kazuo Ishiguro,* Nocturnes, *irony, poststructuralism, psychoanalysis*

LANGUAGE AND VISUAL CODES IN A CONTENT INTENSIFICATION FUNCTION: HOW ABOUT JUDGING WOMEN'S MAGAZINES BY THEIR COVERS?

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ABSTRACT:
In this article we examine the covers of several female magazines from a multimodal point of view, that is, from the aspect of analyzing the linguistic and visual means used with the aim of intensifying the content. The selected corpus consists of the covers of modern magazines, such as "Cosmopolitan", "Elle","Harper's Bazaar" in Serbian, Italian and French. By applying the contrastive method, in this paper we try to point out certain similarities in terms of headlines and visual elements, as well as significant differences regarding the linguistic content itself. By relying on the visual grammar theory, we expect that the results of this research will show that some visual components such as color, centering and format are used in a variety of ways in order to disclose a certain discourse as appropriately as possible, while from a linguistic point of view specific syntax and lexis are used with the aim of establishing contact with the female audience as efficiently as possible. Furher research can address the linguistic and visual codes of magazine covers from a sociolinguistic point of view, as well as in the light of contemporary gender theory.

Keywords: *semiotics, visual grammar, content intensification, contrastive analysis*

IDEOLOGY AND REVERSE SIDE OF MODERN SCIENCE

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ABSTRACT:
Science and scientific arguments have been replaced with ideology, which has become the instrument of capitalist greed. A culture is created that is principally opposed to scientific reasoning. Many become rich through means criticized by science and cast doubt on science in general. Knowledge is not priority but maximisation of profit earned by private investors, it is academic branding instead of true engagement, thus degrading the academic work and intellectual integrity. The publishing industry works against the interests of the academic community. Scientific results become dependent on the sponsors' motives. The industrial form of science works against progress in science. Interrelation with capitalism becomes the modern reverse side of science presented in the form of ideology and ruthless assault of capital. The paper focuses on the questions related to protection of scientific creativity.

Keywords: *science; ideology; profit; creativity; capitalist greed.*

ROMA WOMEN IN THE WORLD OF ENTREPRENEURSHIP: OPPORTUNITIES AND CHALLENGES FOR ACTIVE PARTICIPATION AND STRENGTHENING OF THE SOCIO-ECONOMIC RESOURCE BASE

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ABSTRACT:
The paper follows the analysis of the perceptions of members of the Roma population in the socio-economic sphere of entrepreneurship, regarding their opportunities for active participation and strengthening their resource base (primarily social capital). Bearing in mind that Roma women and at the same time entrepreneurs are burdened with numerous obstacles and challenges in their work, the empirical part of the work tries to determine the attitudes of this group regarding their participation in the labor market through the comparative method and research technique of focus groups. The key questions and results of the research were aimed at: 1. detecting and locating the basic characteristics of the position on the labor market of socially sensitive groups - women members of the Roma population and the potential advantages/problems they face every day, 2. the possibilities and potential of this social and economic sub-layer and groups (Roma women - entrepreneurs) to actively participate in the perception and changes of their own position, 3. perception of the general social and economic climate for the development of business and entrepreneurial capacities of Roma women, 4. analysis of potential channels of communication, digital marketing and tools for changing the social position in the context strengthening entrepreneurial capacities and social capital, 5. the role and importance of personal experience, examples of good practice, solidarity, social entrepreneurship and modern market trends, 6. the importance and role of nurturing authenticity and personal stamp in business, 7. the importance of empowering marginalized social groups - Yes am i about stronger together?, 8. raising the level of information of the general population regarding the above-mentioned problems - how well do we know each other? The concluding tones of the paper are aimed at detecting the answer to the key question: Female entrepreneurship of sensitive social/marginalized groups - (un)bright future ahead of them/us?

Keywords: *women entrepreneurs, Roma population, marginalized social groups, social capital, labor market*

MOTIVATION FACTORS IN A MARKETING TEAM

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ABSTRACT:
Starting from the importance of motivation theories in the field of organizational management, the aim of this paper is to investigate the motivation factors that drive members of a marketing team. The research is based on a survey conducted on a sample of 32 respondents in the education marketing sector in the Republic of Serbia, during which the effects of motivation on the satisfaction of marketing team members and their productivity at work were pointed out. During the research process educational institutions were perceived as providers of educational services, which increase the human capital of students as consumers. Descriptive statistics and t-test were used during data processing and analysis. The results of the research were compared with relevant studies that analyzed the issue of motivation in the marketing sector, during which a useful knowledge base was created for future studies in this area.

Keywords: *motivation, motivation factors, marketing team, job satisfaction, engagement*

SOCIAL AND HUMANITARIAN DIMENSION OF THE MEANING EVOLUTION OF THE RUSSIAN CINEMATOGRAPHY

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ABSTRACT:
This article analyzes the complex process of spreading ideological concepts, social meanings, norms and attitudes through Russian cinema. This process is viewed as a dynamic cultural and historical phenomenon associated with social, economic and political changes in public relations. The material of the article substantiates the need to understand the promotion of social meanings, norms through cinema at various historical stages of the country's development as a dynamic, but at the same time, an evolutionary process. An analysis of the semantic evolution in cinema in accordance with the historical periods of the country's development makes it possible to determine the nature and dynamics of interaction processes in the social, communicative and cultural environment. A socio-philosophical analysis of the interaction of socio-political and information and communication processes allows us to reveal the specifics and features of the promotion of ideological concepts in Russian cinema, and also indicates that even during periods of strict control over cinematographic production in the Soviet period, the process of forming ideological structures and meanings through cinema was largely determined by both historical events and public opinion.

Keywords: *idioms, cinema, Russian cinematography, social meanings*

EMOTIONAL INTELLIGENCE AS A SOURCE OF TRANSFORMATIONAL LEADERSHIP BEHAVIORS

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ABSTRACT:
This research study investigates the role of emotional intelligence of leaders in the transformational behaviors perceived from the perspective of employees in insurance companies in Serbia. In the scientific literature, the relationship between emotional intelligence and effective (transformational) leadership is considered mainly from two different positions. The first recognizes the concept of emotional intelligence as a key attribute of a leader, i.e. a significant predictor of his transformational behaviors. Another view represents the widespread skepticism about the connection between emotional intelligence and leadership outcomes. Accordingly, the main goal of the research is to examine and prove that the emotional abilities of the leader positively influence on his leadership style. The research study was conducted through a structured online survey using a random sampling technique. The sample consisted of 130 employees in two insurance companies in Serbia who had the task of evaluating the transformational leadership style and emotional intelligence abilities of their immediate leaders.The Pearson correlation coefficient shows a strong positive relationship between emotional intelligence and percived transformational leadership style. However, only two emotional intelligence abilities (other emotions assessing and use of emotions) make a significant contribution to predicting the transformational behaviors of leaders.

Keywords: *emotional intelligence, transformational leadership, the ability model of emotional intelligence, managing emotions.*

THE THEATRE OF THE OPPRESSED - BETWEEN THEATRE PRACTICES AND TOOLS FOR SOCIAL CHANGE

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ABSTRACT:
Applied theatre is an important tool for working with a community that has the power to instigate social change, as well as to promote sensitization of the community and its unification. The Theatre of the Oppressed is indeed one of applied theatre formats, which has, during its development, been used in a variety of contexts. It has gone from a drama technique which dealt only with socio-political issues in Brazil, to the present-day when this methodology is used all over the world as a universal tool for education and empowerment of vulnerable groups, but also as part of the process in creating works of art, performances and plays.
As an educational technique, the Theatre of the Oppressed has proven to be highly effective when mapping, analyzing, and solving different social and individual problems through dramatic expression.
The paper will explore the Theatre of the Oppressed, the theory and practice, by describing the process of the forum theatre step by step and by offering specific examples of usage of this methodology in both theatre and educational practices in Serbia. The paper will attempt to paint a better picture of what the Theatre of the Oppressed looks like in practice, what its roots and scope are, as well as to what extent this type of theatre is art, and to which it is and educational tool. Finally, it will explore how this theatre format has changed and adjusted to the social needs and circumstances.

Keywords: *The Theatre of the Oppressed, forum thestre, applied thestre, vulnerable groups*

A CRITICAL REVIEW OF THE INFLUENCE OF SOCIETY, RELIGION AND POLITICS ON CULTURAL-HISTORICAL OBJECTS IN NOVI PAZAR (CASE STUDY OF THE ARAB MOSQUE)

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ABSTRACT:
The old bazaar in Novi Pazar is part of the historical city center on the banks of the river Raška. There is a large number of architectural and urban values that belong to the group of protected cultural buildings. One of those is the Arab Mosque, an Islamic religious building from the 16th century. The task of the research will be to examine the attitude of the competent authorities towards the historical heritage when it comes to the reconstruction given that the Arab mosque was demolished . In its place a new mosque was built based on the principles of the old one, yet from completely new materials. Deriving inspiration from this occurrence, the paper will examine whether there were potential methods for preserving the original object and what are the factors that led to demolition of it. Therefore, the question arises whether the mosque could have been saved and completely reconstructed on the basis of the preserved project documentation and according to which regulations and adherence to which standards the demolition was carried out. This paper aims to show the importance of historical and cultural heritage and its impact on the architectural and urban context and to position them in primarily in relation to current political and sociological events. Also, the goal is to objectively and studiously analyze the course of events and the influence of external factors which led to this event, with the initial hypothesis stating that it is the product of social, religious and political pressures.

Keywords: *Old bazaar, cultural-historical heritage, politics, religion, sacred objects*

TECHNOLOGY AS THE DESTRUCTIVE POWER IN THE POETRY OF THOMAS STEARNS ELIOT

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ABSTRACT:
The paper analyzes several works of the famous English modernist and Nobel laureate Thomas Stearns Eliot, characterized by their unusual visualization of the panorama of the modern world, which was irresistibly marked by the industrial revolution and the rapid development of technology. In his creative endeavors, the poet focuses on the negative effects of the aforementioned development process, leading to social degradation and announcing its final decline. Everyday life is presented as a background of man's ontological impoverishment, i.e. destabilization of his identity and dignity. Juxtaposing the desolation of modern civilization with the images of ancient and Renaissance literature and connecting them with mythological and religious paradigms, Eliot indicates that the task of self-definition and providing purposeful answers to the aporias of modern society is almost impossible to achieve today. The primary entropic force that makes the given process impossible is but modern technology, compelling man to embrace consumerism and anti-intellectualism the issues of which are currently unknown and therefore frightening. The aim of such a poetization is to achieve permanence in providing at least, acceptable answers to the disastrous consequences thus making them easier to put up with.

Keywords: *modernism, technology, entropy, consumerism, intelectualism.*

SYNTHETIC-ANALYTIC DRIFT IN COMPARATIVE FORMATION AS ATTESTED IN *COHA*

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ABSTRACT:
The system of comparative and superlative formation relies on both synthetic and analytic means in contemporary English. Synthetic comparatives are coined by attaching the inflectional bound morpheme ***-er****. Analytic comparative forms are formed lexically, i.e. in lexical combinations* ***most + ADJ/ADV$_{positive}$****, where* ***most*** *has the status of a free morpheme. Almost all monosyllabic and disyllabic adjectives which have synthetic comparative forms can be also used with their analytic doublets. Thus, the use of comparative formation strategies in contemporary language has been an intriguing topic for both grammarians and linguistics. While most studies focus on the synchronic aspects of this dichotomy, this paper aims at investigating the phenomenon from the diachronic perspective. Drawing on techniques familiar from quantitative morphological typology (Greenberg 1960, Szmrecsanyi 2012, 2016), the paper analyzes the absolute frequencies of both free (****more****) and bound (****-er****) comparative morpheme in American English (AmE) during the last two centuries. The quantitative data are retrieved from Corpus of Historical American English (COHA, 1811 – 2010). Our findings show that similarly to the British English variety (BrE), the frequency of synthetic forms has been increasing over time with respect to their periphrastic alternatives.*

Keywords: *synthetic/analytic comparison, adjectives, American English, diachronic aspects*

“A LITERARY CLINIC”: INTERPRETATION AND/OR USE OF LITERARY TEXTS IN BIBLIOTHERAPY

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ABSTRACT:
The paper employs Umberto Eco’s dichotomy interpretation/use to examine different reading experiences and strategies. Eco’s dichotomy is suitable for the aim of this paper to demonstrate that the idea of bibliotherapy as a practice of using literary texts according to a predetermined path and with specific objectives owes to arbitrary readings of Samuel McChord Crothers’s essay “A Literary Clinic” (1916). In this essay, Crothers uses a dialogue between the narrator and his friend Bagster to address contemporary debates on the habits and purposes of reading. The gradual unveiling of the narrative strategy tends to illustrate that Bagster’s model represents a limited form of reading (using literary texts).

Keywords: *Samuel McChord Crothers, reading, bibliotherapy, interpretation, use*

SUSTAINABLE DEVELOPMENT, ECOLOGY, ENERGY EFFICIENCY AND RENEWABLE ENERGY SOURCES

THE IMPORTANCE OD APPLYING MODERN MECHANIZATION ON POULTRY FARMS IN THE FUNCTION OF SUSTAINABLE DEVELOPMENT IN SERBIA

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ABSTRACT:
Sustainable development strategy is a targeted long-term process, which affects the economic, social and ecological aspects of life in a country. The development priorities of agriculture, as well as the entire agribusiness in Serbia, are directed towards profitability, potential, available resources and demand on the global market. That is why the goals of developing sustainable agriculture on farms in Serbia are based on international, economic and ecological standards. Given that sustainable management of resources is one of the permanent development priorities, the aim of this work is to point out the importance of applying modern technology on poultry farms in Serbia, as a function of sustainable development. Poultry farming is one of the most developed branches of agriculture. Both the breeding of broilers and the production of table eggs represent one of the most industrialized branches of agriculture in Serbia. For the sustainable operation of modern farms, significant material investments are needed, as well as education about innovations in this area for owners and employees. Modern poultry farms are equipped with machinery that, in addition to the welfare of poultry farming, contributes to increasing labor productivity, saving labor and improving the general state of the environment on farms. The equipment is characterized by a high degree of automation, and the use of information technologies is increasingly being applied. When designing new and expanding existing poultry farms, guidelines are used for the application of clean technologies in the function of sustainable development. The paper consists of three parts. The first part indicates the potential of sustainable development of agribusiness in the Republic of Serbia. The second part analyzes the importance of poultry farms for the agribusiness sector in Serbia, while the third part of the paper indicates the importance of applying modern mechanization on poultry farms.

Keywords: *application, mechanization, poultry farms, sustainable development.*

COMPARISON FUZZY AND INTERVAL TYPE-2 FUZZY SETS APPROACH IN DECISION FOR DEVELOPING SMART CITIES

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ABSTRACT:
A growing number of challenges that cities in the 21st-century face, lead to the need for a new model of urban development. The population rise, migrations, climate changes, environmental degradation, exploitation of non-renewable resources, and digitalization, are just some of the nowadays problems and changes, which set new requirements that need to be tackled. The subject of the paper is ranking the various indicators in the field of management, economics, livability, and mobility, putting at the center people and their environment. A comparative application of the Analytic Hierarchy Process (AHP) methods, triangular and trapezoidal Fuzzy Analytic Hierarchy Process (FAHP) methods, and corresponding hybrid Interval Type-2 Fuzzy Sets (IT2FS) methods in the field of smart city development was carried out. By studying a large number of different indicators and their evaluation, the ranking, which could facilitate the development logistic of smart cities models, is carried out.

Keywords: *smart city, AHP, FAHP, IT2FS*

BIOGAS AS AN ENERGY RESOURCE

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ABSTRACT:
Biomass is a renewable source of energy, which, as plant mass, does not matter how it was obtained; cultivated, collected on livestock farms or grown wild, represents a significant renewable energy source, with about 70 million tons of annual production and about 1800 billion tons of existing biomass on the Earth's surface. Based on the data; Estimates the total energy potential of global annual biomass production at 2,740 Quad[1] (1Quad = 1016 Btu=1,055 x 10^{19} J). Therefore, biomass production is about eight times higher than the estimated total world consumption of energy from all resources (about 340 Quad). Biomass is organic matter that is created by the growth of plants and other living organisms. Of all renewable energy sources, biomass is expected to make the biggest contribution in the future. Renewable energy sources such as biogas, biodiesel, biogasoline (ethanol) can be produced from biomass, and the dry mass is ground into small pieces of pellets, which are burned and used to produce heat and electricity. Biogas can be used to obtain electricity, water and space heating, and in industrial processes. The paper will present an example of the use of biogas from a cattle farm, which is used for the production of electricity and heating on agricultural property "Spreča" in Bosnia and Herzegovina.

Keywords: *Biomass, bioplin, electricity, agricultural property*

WIND POWER PLANT VUČIPOLJE MEASURING CAMPAIGN ANALYSIS

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ABSTRACT:
For the purposes of designing a wind farm, it is first necessary to describe the location and weather conditions characteristic of the construction position. In addition to the examination of the wind potential at the location, the justification of the feasibility of the wind power plant and its contribution to the power system of the Republic of Croatia will be stated.
Depending on the measurements and analyzes of the wind potential of the planned location, conclusions will be drawn about the environmental impact of the planned wind power plant. Since the geomorphological space of the municipality of Gračac participates in three regional spatial units: the Velebit mountain massif, the Lika highlands and the Zrmanja valley up to the slopes of Plješivice in the Poun area, the area where the construction of the wind power plant is planned is considered a hilly-mountainous area characterized by mostly bare and rocky karst, and barren soil. This is an exceptional advantage of initial construction planning.
Finally, we will look into the important items and facts. Based on data processing and field knowledge we will state the facts and comment on the justification for the construction of this wind farm.

Keywords: *wind, wind potential, energy, wind power plant*

THERMO-HYDRAULIC PERFORMANCE OF A SOLAR DOMESTIC WATER HEATER

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ABSTRACT:
Solar collectors are very important for the thermal utilization of solar energy in low-temperature conditions. In order to determine the optimal constructive and operating parameters of a solar domestic water heating system, a parametric dynamic simulation using the System Advisor Model simulation tool was developed. The analyzed solar system consists of flat collectors, a water storage tank, a heat exchanger, and a source of auxiliary energy. The developed model enables simulation of system operation and determination of appropriate thermo-hydraulic characteristics of the solar system. In this research, data from the typical meteorological year for Belgrade, Serbia, is used to determine the optimal size of a storage solar water heating system. The daily hot water demand, storage tank volume, daily average delivery temperature, and collector area's effects on the annual solar fraction were evaluated using the proposed simulation model. Results show the optimal parameters of a south-facing solar collector system, which enable the maximal annual solar fraction.

Keywords: *solar water heater, flat plate collector, thermo-hydraulic performance, System Advisor Model, simulation*

CONNECTION OF PHOTOVOLTAIC SYSTEMS ON THE NETWORK

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ABSTRACT:
With the increase in the need for "cleaner" energy, renewable energy sources are gaining importance. The development of renewable sources is encouraged due to the increase in the price of fossil fuels and environmental pollution. One of the renewable energy sources is the Sun.
Photovoltaic systems, their connection to the grid and the application of photovoltaic systems in practice will be described. Photovoltaic system is a set of equipment that converts the solar energy of the sun into electricity. They are divided into two groups: systems that are connected to the public power grid and systems that are not connected to the public power grid. They are ecologically acceptable and are increasingly used. Using solar energy contributes to environmental protection and reduced carbon dioxide (CO_2), which is one of the causes of global warming.
The conversion technology is clean, it is possible to supply consumers where there is no power system, photovoltaic modules have a long service life and are easy to maintain. In addition to all these advantages, it should be emphasized that energy production depends on the amount of sunlight and the area of the space where the photovoltaic modules are located.
The Republic of Croatia has a great potential for the use of solar energy, which has been exploited more and more recently.

Keywords: *photovoltaic module, photovoltaic system, power grid, environmental impact*

THE INFLUENCE OF THE POSITION AND ORIENTATION OF THE APARTMENT ON ITS ENERGY PERFORMANCE

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ABSTRACT:
This paper aims to determine how important the orientation of the apartment in the building is depending on the energy needs for heating the apartment. According to the rulebook on energy efficiency of buildings in Serbia, there is a possibility to issue a certificate for a part of the building, such as an apartment. This measure was set in order to make it possible for owners or tenants of the building or the build-ing unit to assess and compare its energy performance. From the user's perspec-tive this measure is very important since, apart from reviewing the quality or the deficiencies of space in which they live, it would be an important parameter of economic evaluation of the apartment in the future. The paper will analyze and compare these values for different positions in the horizontal and vertical position of the same apartment in the building. The paper will use the project of the existing residential building in Novi Pazar, which was built as a typical in1980s. In accordance with that, it will be quantitatively shown to what extent the disposition and orientation of the apartment affect its energy performance.

Keywords: *energy performance, building, individual dwelling, disposition, orientation, legislation*

THE BUILDING TECHNOLOGY OF PASSIVE AND LOW-ENERGY HOUSEHOLDS

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ABSTRACT:
The buildability in an energy-efficient (passive) design is crucial. Low-energy and passive household designs are getting ubiquitous. The target is to design sustainably urban quarters, residential and social housings, which are led by climate protection and less energy consumption principles. These building principles get deeper with the years passing by. The new building materials define new architectonic forms, new building technologies, ways of using it. In the focus is also the up-build with 3D printing technologies. Prefabricated 3D building elements, 3D layering on building sites is a fast building technology, which breaks through internationally. With 3D printing applied in civil engineering, the building molds are obtained.
Keywords:
buildability, passive design, less energy consumption principles, 3D layering on building sites

A REVIEW PAPER ON IOT SOLUTIONS FOR OUTDOOR ENVIRONMENTAL MONITORING

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ABSTRACT:
In accordance with the current requirements for constant monitoring of the state of the living environment, and due to the various advantages and constant progress of Internet of Things (IoT) technology, this paper presents some of the architectures suitable for monitoring of, as well as acting on the living environment. Also, the security issues are observed with one solution being given. An architecture example for monitoring terrains that are hard to reach is also given, including the importance of the sensors' sleep mode, especially in such areas, and ways to manage it, with regard to energy efficiency of the system. The notion of Collaborative IoT was also introduced, as well as the importance of applying crowdsensing and IoT agents in these systems. Overall, this paper provides an overview of possible solutions regarding the IoT systems for outdoor environmental monitoring with the comprehensive insight into this field, including rural and urban areas.

Keywords: *Environmental IoT, secure EIoT architecture, energy efficiency, Collaborative IoT*

SUSTAINABILITY IN THE PROSESS OF EDUCATION IN CIVIL ENGINEERING

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ABSTRACT:
Sustainability is not the goal reserved only for technical solutions, systems and generally development. Sustainability is necessary to be obtained in the education process in civil engineering too. The results created within educational institutions have a long term impact on society development. Civil engineering is important branch of economic development. A knowledge base derived from the experience of built facilities creates significant competitive advantage on the market. From the other side the benefits for the whole society, created by knowledge, are available during the complete life cycle of constructed object. If knowledge is concerned as one of sources of value in civil engineering then its continuous improvement and development in civil engineering projects is imperative of vital importance. The main goal of this manuscript is to present the aspects of skills and knowledge acquisition and their improvement of civil and related professions. The goal was also to develop methodology for efficient problem solving in civil engineering and science and also to find the effective approach in sustainable utilization of available resources, as the first condition for advances in science and technology.

Keywords: *sustainability, education, civil engineering, advances, science.*

WASTE MANAGEMENT: FROM GLOBAL PROBLEM TO SUSTAINABLE SOLUTIONS IN THE LOCAL COMMUNITY

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ABSTRACT:

Accumulation of waste is one of the largest problem today. The last decades have completely changed the view-point on the problem of waste: from a sanitary goal (its disposal) in the 80s of the last century, through an environmental goal in the 90s, to sustainable development as a goal at the end of the 20th and the beginning of the 21st century. From a marginal problem to which the eyes were mostly closed, waste management became the central point of global and local community strategies that encompassed all segments of waste management. The initial focus of finding the most adequate way of final disposal, has been shifted to strategies for reducing waste generation and its sustainable use. It is a well-known fact that the amount of waste per capita is many times higher in developed countries than in poor, underdeveloped areas; but they also have the greatest progress in sustainable waste management, which will be shown with representative examples.
In the paper, as a response to the problems of waste management in the local community, waste management options are treated with an emphasis on reducing waste generation (through reduction of consumption and rational use of products - reduce) in the household and local community, appropriate collection of waste (separation of waste and proper disposal) and the possibilities of its use as a resource (from reuse, through recycling to the possibility of creating energy from waste, which should lead to a significant reduction of landfilled waste.

Keywords: *waste management, reduce, reuse, recycle*

EDUCATION, ONLINE EDUCATION, E-LEARNING

NEEDS TO REVIEW AND CHANGE THE UPBRINGING, EDUCATION AND SCHOOL SYSTEM

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ABSTRACT:
Rapid development of science, art, culture, technique, technology and social changes in the world as well as in our country, imposes education of a "new man" for life and work in the new age. This primarily implies the modernization of the school. It refers to the school's organization, pedagogical and didactic-methodical foundations of work. The classical school cannot satisfy those criteria with its rigid organization based on the class-subject system and differentiated positions of both, teachers and students. The new school and teaching need to educate future experts who work on newly emerging sciences and their disciplines, that would be used and that would continuously develop the achievement of technique and technology and all the other fields of human life. For the development and permanent advancement of science, technique and technology, art, culture and life in the democratic society with market orientation in the economy new modern (richer and wider) education and new (more meaningful) culture is necessary. The modern school needs to correspond to the new socio-historical moment and because of that, the modern school must radically change its system as well as the system of education and teaching. In this paper, for the purpose of providing and example, we have processed the changed position of the main factors of teaching process for both, teachers and students.

Keywords: *school, upbringing, education, science, culture*

SIGNIFICANT QUANTITATIVE INDICATORS OF STUDENTS' ACHIEVEMENTS IN THE EXAMINATION PERIODS

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ABSTRACT:
The National Body for Accreditation and Quality Assurance in Higher Education expects from higher education institutions to systematically monitor and check students' grades by subject and take appropriate measures if there are irregularities in the distribution of grades (too high or low grades, uneven distribution of grades) over a long period of time, as well as to monitor and check the pass rate of students by subjects, programs, years and take corrective measures in case of too low pass rates or other irregularities in grading. In order to achieve the required expectations, the paper explains the importance of the selection and presentation of quantitative indicators of students' achievements in the examination periods for obtaining an appropriate qualitative analysis.

Keywords*: statistical quantitative indicators, graphoanalytical data processing, qualitative analysis.*

EMOTIONAL ENGAGEMENT IN LEARNING ENGLISH AS A FOREIGN LANGUAGE DURING COVID-19 PANDEMIC

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ABSTRACT:
Online learning settings, as a direct consequence of the COVID-19 pandemic, have undoubtedly affected parameters for achieving learning outcomes. English as a foreign language and English as a second language have been much debated in relation to motivation, learning strategies, and anxiety in face-to-face and, lately, in distant and e-learning settings. The author explored the matter further by applying the emotional engagement factor to the equation. The research was conducted among first-, second-, and fifth-year students of a non-English major at the University of Slavonski Brod in Croatia. The outlined results will clarify the correlation of the Strategy Inventory for Language Learning (SILL) Scale, the Second Language Motivational Self System (L2MSS) Scale, and the Emotional Engagement (EE) Scale results obtained from participants who had previous experience of online classes during secondary or tertiary education levels.

Keywords: *online, English, motivation, strategy, emotional engagement, University*

CHARACTERISTICS OF DIDACTIC MATERIALS FOR SIMULTANEOUS LEARNING OF ROMANCE LANGUAGES

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ABSTRACT:
Multilingualism has been a part of the language policy of the European Union for many years now. Within its bounds, the knowledge of multiple languages is considered a key competence, necessary for personal, social and professional fulfillment and the tendency towards developing multilingualism has resulted in the introduction of more foreign languages in formal education systems. However, although in most cases institutional education encompasses teaching multiple foreign languages at the same time, within the educational system those languages tend to stay isolated from one another. Even though it is expected that previously acquired linguistic knowledge can influence every new language one studies, the didactic materials which are focused on simultaneous learning of more languages, and therefore necessarily take into account the psycholinguistic, sociolinguistic and educational aspects of furthering the knowledge of several foreign languages at once, remain scarce. Therefore, our paper aims to analyze grammars, textbooks and handbooks dedicated to the parallel teaching of Romance languages, in order to see how they present the linguistic material originating from cognate languages so as to direct the students' attention towards the similarities between different language systems and alleviate the effects of negative transfer. We will also examine the didactic approaches, strategies and techniques the manuals implement in an effort to help the students to make the process of acquiring and developing their linguistic competencies easier and more efficient.

Keywords: *multilingualism, didactic materials, simultaneous language learning, Romance languages, applied linguistics*

DEVELOPMENT OF DESIRED COMPETENCES OF MILITARY LEADERS

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ABSTRACT:
The paper analyses the development of desirable competencies of military officers through the process of higher education. The dilemma is actualized whether innate predispositions or qualities acquired through continuous learning have a dominant influence on leadership? It is pointed out that the knowledge offered by theories systematized in time periods and content approaches do not give a satisfactory answer to unraveling the complex phenomenon of leadership, as well as that modern security problems, research in the field of military sciences and clearly expressed requirements of professional work in the military represent a reference framework within the limits of which it is possible to make an unambiguous definition of the military profession. Theoretically, the concept of combat action is considered, which has all the characteristics of Volatility, Uncertainty, Complexity and Ambiguity (VUCA). A special review is given to commanding as a key activity of elders in the conditions of conducting combat operations. It is emphasized that people brought into a certain relationship with combat assets, tend to make, together with these assets, a kind of socio-technical combat systems and that the effectiveness and efficiency of the execution of tasks directly depends on the leaders at different levels of the military hierarchy, which implies broad powers, responsibility, professional competence and a high degree of autonomyIn this regard, education in a military organization can be viewed as a process of developing general military and professional knowledge, intellectual abilities, character traits, emotional properties, psychophysical fitness and endurance of future military leaders.

Keywords: *leadership, command, combat operatons, education, competencies*

USING TECHNOLOGY AND ONLINE RESOURCES IN THE CLASSROOM

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ABSTRACT:
Because of the COVID-19 pandemic, teachers all around the globe have been faced with numerous challenges with regards to the adaptation of their teaching methods. This paper showcases online tools that can be used in both the virtual and the physical classroom, providing the interactive component that is crucial for a successful class. These cost-effective and engaging online resources include interactive presentation platforms (Mentimeter, Prezi), online quizzes (Socrative, Kahoot), digital canvases (Padlet), as well as tools that are convenient for the concept of flipped classroom. The paper will present the benefits of using online resources in teaching through practical examples and the students' feedback.

Keywords: *online teaching resources, interactive presentation platforms, online quizzes, digital canvases, flipped classroom*

THE EDTECH - FRAMING THE FUTURE OF EDUCATION

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ABSTRACT:
In the realm of education, digital revolution is increasingly generating game-changing advantage because broadband Internet connectivity has derived more economical, accessible and distance-learning solutions. The accelerated integration of technology in education on a worldwide scale, generally referred to as "EdTech," has resulted in substantial modifications to traditional education and new skillset development practices. This encompasses a wide range of applications and assets, including the management of learning systems, virtual classrooms, assistive devices, online learning platforms, augmented reality, gamification, podcasts, 3D printing, machine learning, and mobile applications. These advancements have contributed to the expansion of the edtech industry; investors spent $20.8 billion worldwide in the edtech industry in 2021, which is roughly over 40 times what they invested in 2010. EdTech may assist conventional classroom-based education or allow distant and interactive learning. In order for innovation strategies to accomplish their aspiration of empowering student performance and creative thinking, they must be required to demonstrate a holistic knowledge of the technologies used during teaching practices, the nature of concepts, and crucial issues involving legal implications, real-world opportunity analysis, and ethical aspects of educational equity. The paper emphasizes EdTech's enormous potential to strengthen educational processes by facilitating easy access to interactive, entertaining, and streamlined approaches that encourage new teaching perspectives, a creative mindset, redesigned curriculum, revised performance metrics, and educational experiences.

Keywords: *EdTech, digital revolution, education, AI, digital skills.*

MULTIMEDIA TOOLSET DEPLOYMENT IN THE ENGLISH-COURSE PRESENTATION OF DIGITAL AGRICULTURE

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ABSTRACT
In a general aspect of teaching English as a foreign language (TEFL), English as a foreign language (EFL) is considered stimulating to the English language learners (ELLs) because the TEFL practice in that particular case refers to English language teaching in a country whose official language is other than English. To contribute to a desirable students' English proficiency level in the scope of a comprehensive education—that is, the one that progressively relies on the digitalization process and technological advancements in multiple sectors—various learning methods are applied, frequently favoring the so-called blended learning as a technology-mediated, or web-enhanced, personalized learning policy. A partially self-directed study at home via e-learning platforms (e.g., the Moodle-based course management systems such as Merlin*) was especially promoted at the time of the COVID-19 pandemic, having remained fully operational in case of the English in Digital Agriculture course too.* English in Digital Agriculture *e-textbook thus represents a formal-content learning material, with an emphasis placed on the students' basic interpersonal communication skills (BICS) in the English language and their cognitive academic language proficiency (CALP). The e-textbook's multimedia contents semantically and syntactically comply with the C1 and C2 levels of the Common European Framework of Reference for Languages (CEF), but the exposure to the native speakers' oral and textual styles and a peer tutoring advocacy and tolerance might effectively and ethically assist in the neutralization of educational inequality, or students' achievement gaps, facilitating the students' English-based professional and technical communication in Digital Agriculture.*

Keywords: *agronomist education, Digital Agriculture, English language acquisition, innovation, technological advances*

ANALYSIS OF THE REPRESENTATION OF INFORMATION TECHNOLOGIES AND EDUCATIONAL SOFTWARE IN THE PEDAGOGICAL STANDARDS OF THE CANTON OF SARAJEVO IN BOSNIA AND HERZEGOVINA

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ABSTRACT:

The education system is unsustainable without constant innovation and monitoring of contemporary trends and achievements. Only in this way can children and youth prepare for life in the world around them, instead of learning about the world as it once was. Today's leading innovations are happening in the field of information technology and software design and engineering. General innovation of teaching occurs in two most common ways: individual initiatives of teachers who try to implement teaching respecting the principle of modernity of teaching, and normative when competent educational authorities prescribe standards that must be respected.

This paper presents the results of normative innovation through a comparison of Pedagogical Standards and general norms for basic education in Sarajevo Canton from 2005 and 2018.

Through comparative analysis, it was determined that genuine mere copying is in the domain of prescribing the use of information technologies and educational software, and that the prescribed norm does not correspond to the actual offer of publishing houses and bookstores, especially in the area of educational software.

Pedagogical standards in a good way to systematically introduce innovations into the teaching process and guarantee that the entire population will be covered by them. Unfortunately, the phenomenon of mere copying of teaching aids and aids from the domain of information technologies and educational software in pedagogical standards has been established, which does not correspond to the actual offer of teaching aids at bookstores and publishing houses.

Keywords: *educational system, teaching, pedagogical standards, educational technology, educational (educational) software*

WEB PLATFORM FOR EDUCATION BASED ON GAMIFICATION PRINCIPLES

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ABSTRACT:
Today's students have grown up with digital technologies and have a different learning style, a new attitude toward the learning process, and different motivations for acquiring new knowledge. The challenge is to keep students' attention and commitment to achieving the defined goals and outcomes of the course. In order to ensure that students are active participants with strong motivation and engagement, it is necessary to apply modern teaching methods and approaches. Contemporary pedagogical paradigms and trends in education, strengthened by the use of ICT, create prerequisites for the use of new approaches and techniques in order to implement active learning. Gamification as an integral part of the educational process is one of these trends. Gamification means adding the fun elements of games achieving the final goal through regular tasks, collecting points, moving to higher levels, and competing with other players) or their mechanics and principles in other activities with the purpose of encouraging participation.

This paper presents elements of gamification that can be applied in education. Also, practical examples of the platform for education that was developed and applied at the Academy of Technical-Educational Vocational Studies in Niš on the subject of web programming, and based on the principles of gamification, were presented. The basis of the web platform is implemented in the python programming language on the server and client side. One part of the user side is implemented in the Unity Game Engine using the C# programming language, which is used for game development. The web platform allows inserting questions for tests, dividing questions into difficulties and levels, creating tests of different complexity, and playing multiplayer quizzes in order to encourage a competitive spirit between students.

Keywords: *gamification in education, web platform, modern pedagogical trends*

ACHIEVING AFFECTIVE AND COGNITIVE PRESENCE IN ONLINE LEARNING ACCORDING TO PERCEPCTION OF STUDENTS OD ISLAMIC FACULTIES IN BOSNIA AND HERZEGOVINA

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ABSTRACT:
Purpose of study: Previous studies have shown that the effectiveness of online learning depends on the achievement of affective and cognitive social presence. This paper focus is on the student perception of affecitve and cognitive social presence through purposeful interaction in online classes.
Methodology: The study was conducted among students of islamic faculties in Bosnia and Herzegovina: University of Sarajevo, University of Zenica and University of Bihać. Data for the empirical study was collected by survey questionnaire on a sample n=100 respondents. The questionnaire consists of three parts: respondents` demographic data, questions about the realisation of affective presence and questions about the realisation of cognitive presence according to the adopted questionnaires of Kathy N. Shen i Mohamed Khalifa (2008) i D. Randy Garrison (2017). The data were processed in SPSS (Statistical Package for the Social Science).
Main results: The dispersion of anwers to the questionnaires wasdetermined, whereby there is no significatnt difference in the answers of male and female respondents.
Conclusion: The results confirm the possibility of realizing affective and cognitive social presence in online learning, while respecting the complex construct in which many factors operate simultaneously

Keywords: *online learning, affective presence, cognitive presence, interaction*

USING ESCAPE ROOMS IN SUPPORTING LEARNING IN STEM COURSES: AN EXAMPLE OF AN ESCAPE ROOM IN GENERAL CHEMISTRY

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ABSTRACT:
The potential of gamification in teaching science, technology, engineering, and mathematics (STEM) courses has been increasingly recognized. One of the strategies to gamify teaching and learning is to use escape rooms. Escape rooms are a modern educational tool based on problem tasks, include time limitations, and require students' active participation and cooperative activities. Previous research has indicated that escape rooms can foster the development of subject-specific and soft skills such as cooperation, problem-solving skills, and creativity. Empirical evidence indicates that escape rooms are well accepted in classrooms and that students generally positively perceive them. Furthermore, students reported that using escape rooms enhances subject-specific and general skills. In this paper, we aimed to outline escape rooms as a modern educational tool in teaching chemistry and provide recommendations for using them. Finally, we presented the example of an escape room that is designed for teaching general chemistry.

Keywords: *escape rooms, STEM, chemistry teaching*

ASSESSING STUDENT ACHIEVEMENT BY STANDARDIZED TESTS USING INTUITIONISTIC FUZZY SETS

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ABSTRACT:
The final exam is a standardized testing tool that measures the level of knowledge acquired during compulsory education. Such test is used to measure a student's ability to apply the acquired knowledge and performance, i.e. their competence. The final exam has a high washback effect concerning the fact that it contains both evaluative and discriminative functions. In this paper, we will assess student achievement on the final exam using intuitionistic fuzzy sets (IFS) and intuitionistic distance in order to identify the tasks and topics which students performed less effectively than it was previously assumed. The expected results are presented in the form of fuzzy sets, as they are determined only by the membership function. From the sample, which is presented as an IFS, we extracted level-subsets based on the level of the task difficulty and identified those with the greatest distance from the expected results. Additionally, this analysis can identfy the necessiy to plan the corrective actions that will enable further preparation process more efficient. The analysis can also be extended and adapted so as to determine the optimal choice of a high school for each individual student.

Keywords: *standardized test, level of achievement, intuitionistic fuzzy set, distance.*

EVALUATION, SELF-ASSESSMENT AND PEER EVALUATION IN THE FUNCTION OF MONITORING STUDENT ACHIEVEMENTS

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ABSTRACT:

Measuring and monitoring student's achievement requires continuity and intention in this complex approach. To monitor means to determine in advance of the occurrence of monitoring, to approach it with clear steps and with all the elements of that process. It is of crucial importance to familiarize each student with all the elements that will be monitored and the time frame in which it will be realized. All of the above is aimed at monitoring educational outcomes and the effectiveness of measures adopted, based on those results. This presentation of achievement monitoring leads to accelerated development of mental abilities and psychological functions, because everyone wants to achieve high success, therefore active and continuous learning is ensured. All measurement procedures are interesting for students, although they carry a certain degree of stress, trying not to let dawn teachers and parents. In addition, self-evaluation and peer evaluation can reduce this stress and provide greater involvement and additional continuity to this process. The difference is made by many factors, and some of them were investigated through the research we conducted for this purpose. Evaluation, which determines the level of student achievement during, during and immediately after learning in terms of mastering knowledge, skills and given competencies, belongs to the most important segments of educational work. The entire process of monitoring and evaluating learning outcomes occupies a high place in the hierarchy of teaching values. It is carried out daily, periodically, occasionally, targeted and spontaneous, aimed at individuals and groups. Various approaches are used to collect as much different information and elements of observed phenomena as possible. Their interpretation is the result of systematic questioning and monitoring of respondents. Evaluation in the teaching process should be resorted often, in different ways and in regular terms. In this process, students can and should be active allies.

Keywords: *evaluation, achievement monitoring, self-evaluation, peer evaluation*

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