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ROMANIAN ASSOCIATION OF MANAGERS AND ECONOMIC ENGINEERS
THE ROMANIAN ENVIRONMENT ASSOCIATION – 1998 (ARM)

The 18th International Conference of Constructive Design and Technological Optimization in Machine Building Field

OPROTEH 2023

Conference Proceedings

ABSTRACTS

BACAU
MAY 11-13, 2023

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A. OPTIMIZATION OF MANUFACTURING PROCESSES AND SYSTEMS & COMPUTER AIDED DESIGN AND MANUFACTURING

A.1. MULTI-OBJECTIVE OPTIMIZATION OF INJECTION MOLDING PROCESS USING RESPONSE SURFACE METHODOLOGY

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Abstract. The production quality of plastic parts, the manufacturing cost and the molding efficiency are three important indexes for the development of a new product. In addition, the flow system also plays an important role in the injection molding process. In this study, plastic production quality, production costs, and molding efficiency are considered as optimization objectives. The design parameters include the diameters of the channels and the working parameters of the injection machine. The optimization of the injection process of plastic parts requires the use of a powerful method for solving multi-objective optimization problems. Injection molding is a complicated process composed of a nonlinear system with multiple input and output parameters. It takes polymer material characteristics, injection mold specific characteristics, and process parameters as input variables, while molding efficiency, manufacturing cost, and product quality are taken as output parameters. When determining the characteristics of the polymer material, the channel diameters in a multi-cavity mold and the parameters of the injection molding process are the most important factors affecting the injection molding process. Therefore, the main challenge in the molding process is to quickly and economically obtain high-quality plastic parts. In order to optimize the parameters of the injection molding process, the research done in this article used the response surface method.

Keywords: injection process, response surface method, shrinkage, warpage.

A.2. PREDICTION AND OPTIMIZATION OF THE MICROHARDNESS IN THE MILLING PROCESS

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Abstract. In this work, a modulization using response surface methodology (RSM) of the milling process built according to an experimental database to evaluate and predict the influence of the cutting parameters (cutting speed, feed per tooth, depth of cut) on the microhardness of the machined surface by milling, also an optimization using the genetic algorithm (GA) approaches was made to identify the optimum combination of cutting parameters leading to the best microhardness for the machined surface. The results show RSM model can predict the microhardness with high accuracy, and the most influencing parameter has been identified. The optimal value of cutting parameters that provides the best microhardness has been achieved with the optimization using the GA respecting some specified machining constraints (e.g. machining time, power consumption).

Keywords: milling, microhardness, rsm, genetic algorithm.

A.3. CONTINUOUS FIBRE REINFORCEMENT OF THE HIGH-PRESSURE DUCT OF THE BARREL BASED ON THE UKM-2000 RIFLE

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Abstract. The paper analyzes the effect of continuous fibre reinforcement of the high-pressure duct of the barrel based on the UKM-2000 rifle. Using composite reinforcement will increase the resistance to mechanical damage and accuracy at the expense of a relatively small increase in barrel weight. In the first stage, a real model with a geometry similar to a rifle barrel was made, followed by a modal analysis of the system. In the second stage, a numerical model of the bare actual system of the barrel channel was made (without reinforcement). In further work, reinforcement was made on the lowest step of the barrel in the form of a composite shell based on continuous carbon fibre and epoxy resin. At this stage, modal analysis was performed, followed by a FEM model preparation. In the composite reinforced region, the substitute parameters of the shell material were homogenized. Two-stage homogenization was used. At the first level, an analysis of the microstructure was performed, determining the equivalent properties in the band. In the second, substitute parameters were made in the tested composite after taking into account the winding angle of the fibre strand. A numerical analysis was performed in the Abaqus program using the FEM modal analysis. The agreement between the simulation and experimental results was satisfactory. Usage of composite reinforcement causes resistance to external factors (shell effect) and, in most cases, a stiffness increase leading to an increase in the resistance to mechanical damage and the rifle accuracy. Composite with a fibre oriented in the perpendicular direction to a barrel long axis has minor influence on a system stiffness hence on the above-mentioned accuracy and resistance.

Keywords: nonlinear dynamic, modal analysis, barrel vibration, numerical analysis, FEM.

A.4. EXPERIMENTAL STUDY OF THE EFFECT OF THE FIXING DISTANCE OF ALUMINUM PLATES IN ARC WELDING ON THE MECHANICAL PROPERTIES OF THE WELD BEAD

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Abstract. Electric arc welding is one of the most widely used welding techniques in industry; this type of assembly is used fusion welding to join metals. With the development of technology, the need for high quality and reliable welding has increased for the petroleum, automotive and aerospace industries. One of the factors influencing the quality of the weld is the fixing distance of the parts to be joined. For this, we studied the effect of fixing on the quality of welding in the case of aluminum plates. In this work, an experimental study was conducted on the electric arc welding of aluminum sheets to know the effect of the fixing distance of these sheets on the hardness of the weld bead. For this, several tests were carried out at different distances, but the same welding parameters were used.

Keywords: arc welding, hardness, fixing distance, aluminum sheets.

A.5. PROBLEM OF MECHANICAL CLEANING OF ELEVATIONS OF HIGH BUILDINGS

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Abstract. The paper provides an analysis of appropriate solutions for technical systems designed to perform mechanical cleaning of elevated building facades and towers of wind turbines. The solutions analyzed include facade cleaning machines hoisted on a self-propelled cable, hoisted using a crane cable, moved as an integral part of a crane, and machines having original driving systems with a vacuum system. The concepts presented were critically analyzed, pointing out their advantages and disadvantages, and a characteristics of a relatively universal solution was drawn up, depending on the type of material of the building facade and its height. In addition, the original solution of the universal machine for washing the facades of high buildings was proposed.

Keywords: mechanical cleaning, cleaning machine, elevated building, building façade.

A.6. A REVIEW OF THE MODELS PROPOSED FOR CUTTING FORCE PREDICTION IN CASE OF MILLING PARTS WITH LOW RIGIDITY

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Abstract. Milling of parts with low rigidity is a field that is increasingly attracting the interest of the academic and industrial world, due to the applicability of this type of parts in industrial sectors of strategic interest at national and international level, such as the aerospace industry, nuclear industry, defense industry, automotive industry, etc. The aim of the current paper is to synthesize the models proposed in the specialized literature for the prediction of cutting force in case of milling parts with low rigidity, in order, to identify future research directions. The need to predict/determine the cutting force as precisely as possible lies in the fact that it is cause and, at the same time, effect of both the system dynamics and geometric imprecision of the processed parts, which influences productivity, processing costs and even the process feasibility.

Keywords: milling, low rigidity parts, cutting force models.

A.7. PREDICTION OF THE TRIBOLOGICAL BEHAVIOR OF EPOXY COMPOSITES REINFORCED WITH NATURAL FIBERS USING A SYSTEM OF FUZZY INFERENCES

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Abstract. Natural fiber reinforced epoxy composites have a wide range of applications due to their excellent mechanical properties, low cost, and eco-friendly nature. The tribological behavior of epoxy composites reinforced with natural fibers refers to how these materials behave under friction and wear conditions. Some factors affect the tribological behavior of epoxy composites reinforced with natural fibers, and predicting the effect of these factors can help optimize the tribological performance of these materials. In this study a system of fuzzy inferences is used to predict the factors that affect the tribological behavior of epoxy composites reinforced with natural fibers. The fuzzy logic-based model developed is validated using experimental data. The validation shows that the predicted values are in good agreement with the experimental values, with an accuracy of 97.60% for the amount of wear and 98.88% for the coefficient of friction. The fuzzy logic-based model developed can provide a powerful tool to optimize the tribological performance of the studied material.

Keywords: epoxy composites, natural fibers, tribological behaviour, fuzzy model.

A.8. DEVELOPMENT OF A FUZZY LOGIC MODEL TO PREDICT THE TRIBOLOGICAL BEHAVIOR OF AL/SIC/GR HYBRID COMPOSITES

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Abstract. The combination of SiC and Gr particles in the aluminum matrix results in a hybrid composite with enhanced mechanical and tribological properties, including improved strength, stiffness, hardness, wear resistance, and thermal stability. The properties of the Al/SiC/Gr hybrid composites can be tailored by adjusting the amount and size of the reinforcing particles and the processing conditions. This study consists in developing a method to predict the tribological behavior of Al/SiC/Gr hybrid composites using fuzzy logic. The predicted values, with the developed fuzzy model, are in good agreement with the experimental values, with an accuracy of 97.68% for the wear rate and 97.70% for the coefficient of friction.

Keywords: hybrid composites, Al/SiC/Gr, fuzzy logic, tribological behaviour.

A.9. A REVIEW OF THE RECENT RESEARCH ACTIVITIES IN THE FIELD OF ELECTRICAL DISCHARGE MACHINING

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Abstract. Electrical discharge machining (EDM) is one of the earliest non-traditional machining processes and it is considered today one of the most popular machining methods. EDM process is based on thermoelectric energy between the work piece and an electrode, so that the discharge energy generated during the operation characterizes the productivity of the process. Due to the well-established machining options utilized in the industry of aerospace, automotive industry and surgical components for precision machining and making complex geometrical shapes in hard-to-cut materials, created a significant amount of research interests in this field. This paper provides a review on the various academic research activities carried out in the last years and various developments in the field of EDM related to improvement in performance, materials and dielectrics used, improvements in machining rates along with the electrode design and manufacture.

Keywords: electical discharge machining, electrode, dielectric, machining rates.

A.10. SURFACE ROUGHNESS MONITORING FOR EARLY DETECTION OF INTERNAL CRACKS IN OUARGLA TRAMWAY RAILS IN ALGERIA

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Abstract. Rail transport is considered one of the most important means of transportation as it is a crucial and supportive element for the economic movement of countries of all transportation modes. The tramway is subject to several factors that can disturb its movement, such as the heating caused by braking, stresses caused by unbalanced loads, defects and deformations of the rails, and the low coefficient of surface roughness, which is the subject of our study. The aim of this study is to establish a correlation between damage parameters and roughness measurements to contribute to the early detection of internal cracks in the rails of the Ouargla tramway. Processing the measured data provided more insights into the phenomenon of friction and the factors that affect it, confirming that monitoring surface roughness is an essential and crucial element in the movement of the tram, as well as passenger comfort and safety.

Keywords: tramway, rails, surface roughness, deformations, safety.

A.11. FLUID FLOW ANALYSIS OF THE COOLING SYSTEMS WITH VARIOUS NOZZLE GEOMETRIES USED FOR CUTTING PROCESSES

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Abstract. Cooling systems are essential for machine tools as they help maintain the optimum temperature and prevent overheating. Due to the high rotational speeds and friction in the machining process, the temperatures on the surface of the machining tools can reach very high levels, which can lead to rapid wear, deformation and quality problems of the machined parts. Cooling systems work by removing heat from the machining area by means of a coolant (water, oil or emulsions), which is pumped by a pump into a system of pipes and cooling basins covering the machining area. In this way, the heat is taken up by the coolant and removed from the machining area, thus maintaining temperatures at safe and optimal levels. It is important to ensure adequate coolant circulation and maintain a sufficient amount of coolant in the system to avoid overheating and damage to machining tools or work pieces. In addition, the cooling system must be serviced regularly to prevent the accumulation of dirt and deposits that can affect system performance. The MQL (Minimum Quantity Lubrication) is a lubrication method that uses a small amount of lubricant to reduce friction and wear in the machining process. The minimum amount of lubricant necessary depends on several factors, such as the material to be machined, the cutting conditions and the type of lubricant used. In general, the amount of lubricant used in the MQL is around 20 to 100 ml/h, but this can vary depending on the factors mentioned above. It is important to find the right balance between the amount of lubricant necessary to reduce wear and friction, and the excessive amount that can cause cleaning and high cost problems. It is recommended to consult the specifications of the manufacturer of the machine tool and the lubricant to determine the optimal amount of lubricant to use for your specific application. This work aims to make a simulative analysis of the different geometries of the showers used so that they are as efficient as possible in the cooling process.

Keywords: fluid, flow, nozzle, cooling, cutting.

A.12. DESCRIPTIVE STUDY OF EVALUATION, MODELING AND OPTIMIZATION METHODS IN OCCUPATIONAL ERGONOMICS APPLICABLE IN INDUSTRIAL PROCESS OF WELDING WORKERS

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Abstract. Currently, multiple ergonomic methods and models have been identified to conduct workplace assessment on ergonomic factors. However, knowing who should submit such an evaluation request is one of the common questions. Therefore, this research aims to review various methods and models to distinguish the key concepts of workplaces improvement in which welders are involved. This was done through a literature search, which, from a methodological perspective, amounts to a descriptive study. In this way, in conclusion, it has been visible that the predominant methods used in occupational ergonomics evaluate physical and mental fatigue, as well as the efforts made with regard to

uncomfortable jobs, which cause musculoskeletal disorders (MSDs) of occupational origin, indicating predominantly the levels of risk, without taking into account the interventions for a better workplace design. In terms of ergonomic designs, these are directed towards risk and/or safety measures, quality of finished products and productivity in the workplace to increase the effectiveness of these improvements. To conclude, the occupational ergonomic model for welders, from a holistic point of view, consists of bringing together all the factors of occupational ergonomic workplace assessment as well as the workplace assessment improvement interventions in the specific industrial area.

Keywords: ergonomic methods, WMSD, welding workers, ergonomic model, job assessment.

A.13. THE INFLUENCE OF THE PROCESSING ENVIRONMENT ON THE SURFACE QUALITY CHARACTERISTICS ON NON-FERROUS MATERIALS

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Abstract. The aim of present paper is to investigate the influence of cryogenic cooling on surface quality proprieties. Three cutting speeds and two depths were used in order to observe the influence of the roughness, micro hardness and residual stress distribution on surface layer. The test was conducted on al 6061 T6 aluminum alloy, material that is used often in aerospace industry. From the results can be observed that cryogenic cooling at -60o Celsius, lead to a decrease of the surface roughness and the change in residual stress distribution in surface layer, by comparing with dry milling. Residual stress was investigated also using a FEM method analysis. The use of FEM was conducted in order, to observe if the rise of temperature will change the amount of stress n the surface layer.

Keywords: LN2, cryogenic, cooling, turning, milling, cutting, aluminum 6061.

A.14. INFLUENCE OF CUTTING PARAMETERS ON SURFACE QUALITY IN MILLING OF TI-6AL-4V TITANIUM ALLOY

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Abstract. The aim of present paper is to observe the influence of different cutting parameters on surface quality when Titanium alloy is processed. Due to their excellent strength-to-weight ratio, exceptional corrosion resistance, and suitability for usage in high temperatures, titanium and its alloy are regarded as key engineering materials for industrial applications. Three different cutting speeds and two different cutting depths were used in order, to observe

the influence over the surface roughness and residual stress distribution. Roughness was tested using an optical profilometer from Zygo and residual stress distribution in surface layer was measured using with an X-ray residual stress analyser, μ-X360s (PULSTEC Industrial Co., Ltd., Japan) whose working principle to determine stress is based on the cosα method [1]. From the results it was observed that increasing of cutting speed lead, to an increase of surface roughness. Also, residual stress distribution shows high tensile values in surface layer. The use of a higher depth lead, to a similar tendency but with higher values of residual stress.

Keywords: milling, cutting, titanium alloy, roughness, residual stress.

A.15. THE EFFECT OF MACHINING PARAMETERS ON THE SURFACE QUALITY AT POLYAMIDE

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Abstract. Among many engineering polymers, polyamide is considered a superior engineering material for wear-related applications. Because of its excellent sliding and mechanical properties, its tribological properties are often better than those of PEEK, PET or POM. Polyamide is a popular engineering polymer for a wide range of light and heavy duty functional applications. This material has excellent mechanical properties, high durability and dimensional stability. It can also be used as a wear-resistant material. The aim of present paper is to observe the influence of cutting parameters on surface quality generated by milling process. Three different cutting speeds / feeds and cutting depths were varied in order to observe the influence. From the results it was observed that a high cutting speed, equal to 300m/min lead to a good quality of surface while a decrease of cutting speed to 100 m/min generate PA deposits on surface. The use of high depth of cuts lead to high temperature that influenced the topography of surface.

Keywords: polyamide, wear-resistant, material, sliding and mechanical properties.

A.16. REUSE OF COOKING OILS FROM THE FOOD INDUSTRY AS DIELECTRICS IN ELECTRICAL DISCHARGE MACHINING. A CASE STUDY

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Abstract. Greening economies and creating circular value chains is a major global objective, which calls for additional efforts to manage material, water and energy flows so that their ecological footprint is minimised. Reuse and recycling of products is an essential part of this approach as it facilitates the extension of product life cycles and minimises waste. Used oils from the food industry represent an important candidate for recycling both from the perspective of the considerable amount in which they are generated, as well as from the

perspective of the simplicity and low costs of the recovery methods that can be used to transform them back into raw material, such as, for example physical methods. From this perspective, the aim of the current paper is to perform a comparative analysis of the performance of a recovered used cooking oil to its crude state when they are used as an alternative to the mineral dielectric of an electrical discharge machine. The processed material is the C120 tool steel.

Keywords: reuse, cooking oil, dielectric, electrical discharge machining.

A.17. STUDY ON THE INFLUENCE OF THE FOCUSING TUBE ON THE QUALITY OF ABRASIVE WATERJET MACHINED SURFACES

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Abstract. Abrasive water jet cutting (AWJC) is an unconventional machining process increasingly used by manufacturers due, on the one hand, to their attempt of aligning with the global requirements of ensuring a sustainable production, and, on the other hand, to a combination of advantages that this technology offers compared to other unconventional techniques (e.g., applicability on a wide range of materials, good quality of processed surfaces, safety for the operator). However, process performance is largely affected by the process input variables, such as machining parameters, equipment and workpiece material. Among the equipment's components, the focusing tube plays an important role in ensuring the machining quality, as it may affect the transfer of kinetic energy from the water jet to the abrasive particles and, consequently, the erosion power of the formed mixture. The aim of the current paper is to analyse the influence of the focusing tube on surface quality obtained from AWJ machining of aluminium alloy parts with different thicknesses.

Keywords: abrasive water jet cutting (AWJC), surface quality, focusing tube, aluminium alloy.

A.18. USING THE AIDA METHOD IN THE DESIGN OF NEW ELEMENTS FOR THE ASSEMBLY OF PHOTOVOLTAIC PANELS

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Abstract. The analysis of interconnected decision areas - AIDA - is a multicriteria analysis method proposed several decades ago for the design of equipment. With the accelerated diversification of consumer markets, decision-making has become highly automated, relying heavily on system-specific criteria and less on social or human criteria. In recent years, the return of analytical evaluation methods with an interdisciplinary character can be felt. The AIDA method presented in this study is very productive if the structure of the problem is well known from the beginning, having the advantage of being relatively easy to learn and apply. The purpose of applying this method is to identify and comparatively evaluate all

solutions compatible with the given theme. This study provides a method to find the complete set of feasible solutions to a problematic situation in the field of photovoltaic panel mounting structures on various types of roofs. In doing so, the paper provides the means to examine all solutions in either lists or diagrams, leaving company decision-makers to make informed judgments about how to approach such a problem or its subsets. The working methodology is as follows: (1) examine as many solutions as possible that satisfy the designed functions; (2) the evaluation criteria are established; (3) the optimal solution is chosen concerning the functions to be performed and the adopted criteria. The identification of the necessary functions is, in fact, based on a series of defining functions for the analyzed product (power mode, type of transfer between two or more elements, level of protection, positioning, stability etc.). The ordering of these functions is generally done on a grid of three values. The present study also demonstrates the analytical advantage of using symbol and label graphs in the AIDA methodology, providing an innovative contribution to the approach. Through this study, the identification of potentially fruitful ways of solving some interdisciplinary problems is carried out.

Keywords: AIDA, CAD, CAE, creativity, design, decision-making.

A.19. TEXTURED SURFACES OF ARBOBLEND V2 NATURE

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Abstract. An engineering technique called surface texturing is used to enhance the surface quality of plastic injection-molded products. The topography of the part is altered along with its surface qualities when this procedure is used. When other materials come into contact with the textured surface of plastic objects, the novel features that make them unique become useful. Of course, these qualities can change based on the texture's geometry, size, and laser location. The Arboblend V2 Nature biodegradable polymer's surface characteristics as achieved through laser texturing are presented in the current paper. Three different geometries—hexagonal, square, and triangular—were examined, and various behaviors of them were highlighted during surface free energy (SFE) and contact angle (WCA) measurements: a hydrophobic character for square and hexagonal geometry with distilled water as the measure liquid, and a hydrophilic character with diiodomethane as the measure liquid; the contact angle measurements for triangle geometry were impossible to extract because the drop turns into a sphere. The sample with hexagonal geometry had the lowest friction coefficient, which also varied based on the texture of the geometry. Increased surface micro-hardness in comparison to the base material was revealed by the micro-indentation tests. Based on the findings, it is also possible to substitute non-biodegradable polymers from other industries as their use in the development of textured surfaces is feasible.

Keywords: LST, Arboblend, injection molding.

A.20. EVALUATION FOR ENVIRONMENTAL HEALTH WITHIN PORTAL FRAMES AND PROJECT MANAGEMENT OF MANUFACTURES AT SUSTAINAIBLE COMMUNITY HEALTH TOURISM DESIGN FACILITIES

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Abstract. In this paper useful outcomes are presented for the evaluation of particular portal frames, for environmental health within portal frames at sustainable tourism infrastructures. Useful monitoring schemes are presented for facilities within sustainable community health facilities and alternative types of tourism. This working study presents the evaluation of particular portal frames at associated community health construction facilities in terms of safety and qualitative environmental health. Also are presented proper monitoring schemes and good indoor quality project management using proper manufactures, taking into account climate change conditions. The research and the results are useful for digital drawing utilities to stakeholders in terms of training and environmental impact assessments for qualitative environmental health at indoors, outdoors at future applications in terms of sustainability and public health protection in future safe integrated sustainable community health tourism facilities' extensions like green houses, green buildings, sports facilities, safe logistics facilities or other sustainable construction economic design facilities at post COVID-19 era.

Keywords: environmental health, climate change, sustainable tourism infrastructures, safe construction facilities, project management, sustainable community health tourism, sports tourism, COVID-19, environmental impact assessment, digital drawings, public health

A.21. EVALUATION OF MANAGERIAL CHALLENGES FOR INDUSTRY 4.0 APPLICATION IN LIGHTING INDUSTRY

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Abstract. This study aims to contribute to the missing aspect of the literature regarding the challenges of Industry 4.0. Within the scope of the study, first of all, the challenges were determined. After determining the challenges, it was converted into a questionnaire format and presented to decision makers in order to determine the importance levels of the criteria determined by Google Forms. The survey results were evaluated and data analyzes were performed with the SPSS program and Pythagorean fuzzy SWARA. As a result of the data analysis, it was concluded which challenges should be emphasized. In this way, the study will provide guidance on which challenges companies should focus on.

Keywords: managerial challenges, industry 4.0, lighting industry, Pythagorean Fuzzy SWARA.

A.22. NEW ACHIEVEMENTS IN THE FIELD OF SHEET HYDROFORMIG

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Abstract. The article presents a novel tool concept for the hydroforming process that offers two main advantages: an increased number of drawn parts per deformation punch stroke and the elimination of the need for an expensive hydraulic installation to produce pressure. The tool concept is based on the principle of volume constancy. Experimental testing of a simplified tool has been conducted to obtain circular parts with circular channels. Finite element (FE) simulations were performed to predict the optimal forming conditions for this specific case, with the working pressure being adjusted as a control parameter. The experimental and numerical results validate the new tool concept. Based on this concept, two solutions of the equipment's are presented. The investigations suggest that this new die concept can be applied in the manufacturing of various complex sheet metal parts used in aero and automotive industry.

Keywords: channel hydroforming, sheet hydroforming, unconventional forming, numerical simulation, sheet metal, deep drawing.

A.23. EFFICIENCY STUDY IN A TIRE COMPANY

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Abstract. In this study, the lowest cost, most accurate and fastest efficiency and production quantity/tonnage tracking form was created for a tire company that is going digital but has not fully completed its digital transformation. The aim here is to ensure that the company can use its workforce and time most efficiently throughout the digitalization process in front of it. As a result of long studies, the most accurate method was chosen and a form was created in which "Production efficiency", "Quantity cut" and "Tonnage cut" were calculated in line with the company's request. The most important advantage of the created form is that an engineer has a tool to process the data as soon as possible and get the most accurate results. In this way, it will be possible to monitor daily productivity and prevent unplanned stoppages. At the same time, thanks to the quantity and tonnage calculations added to the form, it sheds light on the company's decisions for the planning and production side.

Keywords: efficiency, effectiveness, quantity, tonnage, bias, extruder.

A.24. RHEOLOGICAL-NUMERICAL MODEL OF DENTAL MATERIALS IN TERMS OF TRIBOLOGICAL WEAR

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Abstract. Since it is recognized the extremely important role played by transport and lifting installations in industry, construction, the extractive field, but also in the mechanization of loading-unloading works, the movement of equipment or materials, special attention is paid to the growth and diversification of the production of some such installations at the level of the most advanced technologies. The paper presents some operating principles and characteristics of a "Spider Crane" lifting and transporting installation, as a much cheaper and more effective solution than ordinary cranes, for works where the lifting demands do not exceed 10-14 tons and heights greater than 40 m. Thus, an analysis of the hydraulic lifting system is carried out, based on the calculation of hydraulic fluid flows for the drive pumps, the specific speeds and forces of the hydraulic motors, a mechanical analysis of the clamping system with hook, as well as a finite element analysis of some mechanical and hydraulic components.

Keywords: "Spider Crane", lifting system, hydraulic pump, hydraulic motor, hook, FEM.

A.25. ASPECTS REGARDING THE STUDY OF HYDRAULIC AND MECHANICAL PARAMETERS OF A "SPIDER CRANE" SYSTEM

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Abstract. Since it is recognized the extremely important role played by transport and lifting installations in industry, construction, the extractive field, but also in the mechanization of loading-unloading works, the movement of equipment or materials, special attention is paid to the growth and diversification of the production of some such installations at the level of the most advanced technologies. The paper presents some operating principles and characteristics of a "Spider Crane" lifting and transporting installation, as a much cheaper and more effective solution than ordinary cranes, for works where the lifting demands do not exceed 10-14 tons and heights greater than 40 m. Thus, an analysis of the hydraulic lifting system is carried out, based on the calculation of hydraulic fluid flows for the drive pumps, the specific speeds and forces of the hydraulic motors, a mechanical analysis of the clamping system with hook, as well as a finite element analysis of some mechanical and hydraulic components.

Keywords: "Spider Crane", lifting system, hydraulic pump, hydraulic motor, hook, FEM.

A.26. EXPERIMENTAL INFLUENCE OF CORROSIVE AGENTS ON THE MECHANICAL CHARACTERISTICS OF STEELS

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Abstract. Since it is recognized the extremely important role played by transport and lifting installations in industry, construction, the extractive field, but also in the mechanization of loading-unloading works, the movement of equipment or materials, special attention is paid to the growth and diversification of the production of some such installations at the level of the most advanced technologies. The paper presents some operating principles and characteristics of a "Spider Crane" lifting and transporting installation, as a much cheaper and more effective solution than ordinary cranes, for works where the lifting demands do not exceed 10-14 tons and heights greater than 40 m. Thus, an analysis of the hydraulic lifting system is carried out, based on the calculation of hydraulic fluid flows for the drive pumps, the specific speeds and forces of the hydraulic motors, a mechanical analysis of the clamping system with hook, as well as a finite element analysis of some mechanical and hydraulic components.

Keywords: "Spider Crane", lifting system, hydraulic pump, hydraulic motor, hook, FEM.

B. OPTIMIZATION OF TECHNOLOGIES AND EQUIPMENT FROM PROCESS INDUSTRIES

B.1. DETERMINING A RELATIONSHIP BETWEEN THE ENGINE SPEED AND THE ELECTRICITY CONSUMPTION OF IN ORDER TO IMPROVE OPERATING COSTS IN THE CASE OF A HAY BALE SHREDDER

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Abstract. Bale shredders are used in agricultural ventures to process crops or their by-products to more manageable lengths. Various destinations for the shredded materials require specific cutting lengths. The cutting length for a certain raw material depends on the engine speed. The operating costs for a shredder depend on its electricity consumption, which is related to the properties of the shredded raw material. Our aim is to compare the electricity consumption of a bale shredder to its engine speed while shredding hay. These results will be used to propose an improved version of the shredder, with improved operating costs.

Keywords: bale shredders, engine speed, electricity consumption, hay processing, operating costs.

B.2. MODELLING AND OPTIMIZATION OF FOLIC ACID SEPARATION USING IONIC LIQUIDS

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Abstract. Folic acid separation process through reactive extraction using Cyphos Il 103 and heptane as an organic phase was modeled using Grey Wolf Optimizer (GWO) and Artificial Neural Networks (ANNs), and the data produced demonstrated good agreement between predicted and experimental results.

Keywords: grey wolf optimizer, artificial neural networks.

B.3. DETERMINING THE MOVEMENT OF AN AMPLIFICATION MECHANISM

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Abstract. The movement of the components of a mechanism is determined by various methods to design it as conveniently as possible. This paper discusses a classical method of determining the motion of a mechanism's components. From the multitude of mechanisms existing in the literature, one has been chosen, that amplifies the movement of the active element of this mechanism, by the way it is realized. The determination of the motion of the components is based on the coordinates of the fixed components and their dimensional elements. Following the mathematical calculation, a series of results are obtained which can describe the movements described by the components of the mechanism, which are general for any operational situation of the mechanism.

Keywords: mathematical calculation, mechanism, the classical method.

B.4. THE BEHAVIOR OF BULKY RECYCLABLE CARDBOARD WASTE DURING COMPACTION/BALING USING HORIZONTAL PRESSES WITH THE CONTINUOUS FLOW

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Abstract. The management of recyclable waste is a complex process that starts from the collection of waste, its transportation and recovery in the form of bales, each stage requiring time and costs. These activities can be made more efficient by using appropriate handling, collection, compaction, and baling equipment. Being difficult to manage, cardboard waste is first transformed into bales. Vertical presses with the discontinuous flow can be used for small quantities, but horizontal presses with the continuous flow are used for large quantities, the formed bales being then tied with wire or plastic threads to make it easier to handle and transport. Compaction takes place in several cycles, the process being similar to that of agricultural presses for straw and hay, after each feeding (cycle) a pressing is carried out with the help of a large piston. In the pressing phase the stresses in the compacted material increase, while in the piston withdrawal phase, the material expands slightly and the resistances (stresses) decrease to zero. The formation of a bale is generally carried out in ten similar cycles, at the last stage the press piston remains in the pressing phase for a few seconds to enable the binding system to finalize the formation and binding of the bale. The bales, already formed and tied, remain in the discharge channel longer, being displaced by the bale being formed, depending on its length and the pressure exerted on them by the hydraulic system at the back of the channel. Our paper presents the resistances to the formation of a bale of recyclable cardboard, in the ten stages of its formation, up to binding, for the pressing phase and the expansion phase, including the variation mass of the forming bale. It also shows the energy accumulated in the bale for each work cycle and the total energy required for its formation. The presented data can be used both by the builders of

baling presses for recyclable waste, as well as by their users to optimize the process and achieve the best settings.

Keywords: recyclable cardboard, continuous flow presses, baling cartons, baling forces, baling energy.

B.5. A RESEARCH ON THE INVESTIGATION OF THE ENVIRONMENTAL EFFECTS OF SILVER OXIDE (Ag_2O) NANOPARTICLE ADDITIVES IN DIESEL ENGINE

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Abstract. In the case of a complete combustion reaction in engines, the products released do not directly threaten human health. However, combustion can never occur completely in an internal combustion engine. Therefore, incomplete combustion products such as hydrocarbon (HC), carbon monoxide (CO), nitrogen oxide (NO_x), smoke emission and complete combustion products such as CO_2 are thrown into the atmosphere. In this study, the change of the above-mentioned basic exhaust emissions was experimentally investigated in test fuels created by adding 50 ppm and 75 ppm Ag_2O NPs to cotton oil methyl ester, which can be used as an alternative fuel in diesel engines. In experiments, nano-additive improved the thermal conductivity, mass dissipation and heat transfer of the test fuels, and resulted in reducing CO emissions as it provided a higher oxidation rate of hydrocarbon molecules. Due to the improvement in the combustion reaction, CO_2 emission increased with a product of complete combustion. The increase in CO_2 emissions was 3.17% and 3.97% for CAg-50 and CAg-75 fuels, respectively, when compared to C0 fuel at 40 Nm load. The NPs additive increased the lower calorific value of the fuel and cylinder temperature. This situation caused an increase of NOx emissions by 3.69% and 7.47% CAg-50 and CAg-75 fuels 40 Nm load. Adding of NPs in base fuel reduced viscosity and density and provided better atomization. So, a reduction in smoke emission was obtained with NPs addition by 35.09% and 47.32% in CAg-50 and CAg-75 fuels, respectively, compared to CO fuel at 10 Nm load, while 7.45% and 19.43% at 40 Nm load.
Acknowledgment: This study was supported by Research Projects Coordination Unit of Nigde Omer Halisdemir University with ref. number FMT-2020/1 BAGEP and MMT-2023-YEDEP. The authors thank to Research Projects Coordination Unit of Nigde Omer Halisdemir University for their supports.

Keywords: exhaust emission, biodiesel, diesel engine, silver oxide (Ag_2O), nanoparticles.

B.6. BEHAVIOR MODEL OF WEAKLY COHESIVE SOILS IN THE STATIC COMPACTION PROCESS

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Abstract. The paper deals with aspects regarding the evaluation of the static compaction performance of weakly cohesive soils. In this sense, the authors developed a model of soil behavior in the compaction process, based on the synthesis of the results of experimental investigations regarding the geotechnical characteristics of some soils frequently

encountered in current practical activity. The specificity of the model consists of the predictive evolution of its characteristic parameters depending on: the initial condition of the terrain to be compacted and the geometry of the roller-terrain contact. With this model, it is possible to evaluate the stage reached at a given moment in the performance of the compaction process, as well as the evaluation of its final results based on the characteristic parameters of the roller, the compaction technology and the terrain.

Keywords: cohesive soils, static compaction process.

B.7. SUSTAINABLE ISSUES IN 3D PRINTING OF FILAMENT MATERIAL EXTRUSION

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Abstract. Sustainability is a broad concept adopted to reflect the need for civilization to work with its means and to use resources and products in a manner that will not affect the quality and well-being of future generations. It is characterized by the "triple bottom line", the need for sustaining and even reconciling environmental, social and economic demands. Therefore, sustainability is increasingly important in all stages of the life cycle of a product. Process parameter control for sustainable 3D printing is a very complex procedure that likewise affects time and cost. This work presents parameters effects on sustainability issues of the fused filament fabrication process with practical examples. Specific interest is given to details and shape of the built part and which of the parameters should be considered to achieve optimized quality.

Keywords: sustainable, 3D printing, material extrusion.

B.8. EXPERIMENTAL AND NUMERICAL ANALYSIS OF THE SYSTEM OF AN ADDITIONAL CAR BODY SHIELD LOADED WITH A BALLISTIC IMPACT

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Abstract. Special purpose passenger cars are characterized by appropriate impact resistance to the effects of firearms. Their structure, especially the motor-car body, is modified in such a way as to constitute an effective protective barrier against small arms ammunition. This work presents the idea of the possibility of using additional ballistic shields based on composite materials. A ballistic laminate made of Twaron T 750 type aramid fabric with a thickness of 5 mm was proposed. The ballistic shield made in this way was attached to the motor-car body with a magnetic mat. In the first stage, the mechanical parameters of the tested ballistic laminate system and the magnetic layer were determined in tensile tests for different velocities. The next, numerical analysis was performed in the ABAQUS/Explicit environment. In field tests, the considered system was analyzed for impact with a 9x19 mm FMJ Parabellum projectile and then the results were validated in a numerical environment. In addition, fragments generated by a hand grenade (DM-51 equivalent) were analyzed numerically. The obtained numerical results show an appropriate agreement with field tests, which proves that the proposed constitutive model and the identification of the model constants were carried out correctly.

Keywords: nonlinear dynamics, impact load, dissipation energy, numerical analysis, FEM.

B.9. APPLICATION OF ADVANCED ENGINEERING METHODS FOR IMPROVING THE QUALITY OF TECHNOLOGICAL PROCESSES OF VULCANIZING AUTO TIRES

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Abstract. The present work addresses the application of advanced methods, specific to quality engineering, to improve vulcanization times on the external processing cycle of several types and sizes of automotive tires. This approach envisages the use of the SIX SIGMA method for verifying the distribution of the measured values of the external vulcanization times between the normal specification limits (lower / LIS and upper / LSS). The purpose of this method is to improve the performance, efficiency and quality of car tire vulcanization processes by optimizing external vulcanization times. Through the analysis carried out, were identified the possible causes of the recorded non-conformities (delays and defects), as a result of not fitting the " Gaussian " distribution between the specification limits. Thus, a program of corrective measures was carried out in conjunction with specific maintenance operations, after which the Gaussian normal distribution was checked again for the newly measured values of vulcanization times that correspond to the normal limits of the imposed specifications (LSS = 2.5). Such a distribution characterizes a real level of maximum performance "6 σ ", equivalent to 3.4 defects per 1 million opportunities, which means that by carrying out the maintenance operations the goal function was achieved, namely the optimization of the external vulcanization times on the car tire manufacturing cycle. This situation corresponds to reaching a maximum level of performance equivalent to achieving an efficiency of 99.9997 % and is synonymous with the successful completion of the project to improve the quality of the technological processes of car tire vulcanization.

Keywords: improvement, vulcanization time, external cycle, automotive tires.

B.10. RESEARCH ON MECHANIZED GRAPE HARVESTING WITH HORIZONTAL VINE SHAKING EQUIPMENT

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Abstract. The paper present the experimental results obtained at the harvesting grapes with three types of horizontal shaking equipment (straight rods, elastic nylon bars and metallic bars), for two red varieties and two white varieties. The working regime of the harvesting machine was established according to the physical-mechanical characteristics of the grains. The research looked at the influence of the type of horizontal shaking equipment on the quality indicators of work, such as the losses at harvest, the composition of the harvested mass and the effects on the vine culture.

Keywords: grapes, harvesting, shaking equipment.

B.11. ENERGY EFFICIENCY ANALYSIS AND OPTIMISATION FOR A PUBLIC BUILDING – INSTITUTIONAL, EDUCATIONAL

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Abstract. To ensure thermal comfort for appropriate living and working conditions, public buildings with educational destinations require heating installations to cover both space heating and domestic hot water preparation demands. The main objectives of international and national energy policies aim to reduce the percentage of energy from fossil fuels, as well as increase energy usage efficiency. Integration of systems using renewable energy sources has the purpose to increase both energy supply security and environmental protection (lower greenhouse gaseous emissions), as well as the development of viable energy technologies within a sustainable development context. On short- or medium-term analyses, renewable energy sources (RES) - solar, wind, geothermal, hydro and biomass - cannot represent a dependable alternative to energy from conventional sources. Considering RES advantages (abundant, ecological, low-cost, independent of imports), and possibilities of an association with proper energy storage systems, or low-polluting energy sources (biomass, small nuclear installations), might increase the system's sustainability. This paper describes an analysis performed on a public building (the main building of the Faculty of Mechanical Engineering from "Gheorghe Asachi" Technical University of Iași, Romania, and proposes energy-efficient thermal insulation, as well as an alternate heating system that uses energy from RES. The technical solutions and equipment are based on the design calculations recommended by the Romanian Standards (SR-1907) for the specified building destination and location.

Keywords: thermal energy; renewable energy sources; heat losses calculation; solar energy; pellet/biomass energy.

B.12. END-OF-LIFE MANAGEMENT OF PHOTOVOLTAIC MODULES – A REVIEW

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Abstract. Implementation of renewable energy sources as sustainable development alternatives to energy from fossil fuels, represented the goal of the last decades of the previous century and the first part of the present one. Given the immense energy availability from the Sun, solar photovoltaic (PV) solutions triggered research studies on new materials and manufacturing technologies, current markets being flooded with PV panels with various conversion efficiencies and characteristics. At this time, the number of damaged and replaced PV panels is still insignificant, but shortly a large number of panels will reach their operational limit and should be disposed of properly. This End-of-Life (EoL) analysis presented in this paper intends to detail the management processes and the outcome of recycling PV panel components. While recovery and reuse represent small but important parts of the recycle management process, the main focus, due to the quantities involved, is on the materials that may be recovered: precious and special metals (silver, copper, aluminum, nickel, titanium, zinc, chromium, tin), hazardous or critical ones (cadmium, lead, selenium, gallium or magnesium, indium, tellurium), as well as other metals and materials (silicon, steel, EVA, glass). Main technologies are divided into three categories, mechanical,

thermal and chemical separation processes, with advantages and disadvantages, with their share of supplemental energy and resources consumption and by-product waste generation: mechanical separation, hydrometallurgy (oxidation, evaporation, reduction, filtration, extraction, precipitation), organic solvent dissolution, ultrasonic irradiation, electro-thermal heating, pyrolysis, dry and wet mechanical processes, etc.

Keywords: photovoltaic modules; renewable energy sources; end-of-life; materials recycling; waste reduction.

B.13. DIMENSIONING AND TESTING TALL TOWERS USING CALCCOL SOFTWARE

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Abstract. In the actual stage of technique, the cost price of tall towers (rectification, absorption, desorbtion) represents 10% of total investments in petrochemical installations and 21% in fertilizer installations. It is obvious, in this case, the importance of an optimized calculation and construction of tall towers. The tall tower loads are various and complex, permanent or temporary, from operating parameters (pressure, temperature) to climatic loads or accidental loads (earthquakes etc.). The proper design work, construction, installation mounting and exploitation of tall towers from a safe functioning point of view have deep economic implications. Designing a tall tower with smaller wall thickness has as a result a cheaper tall tower and thus smaller investment costs, but a less safe tall tower. Analyzing the design activity we can observe the duality of safety – economics. Most computer software on today's market provides calculations according to ASME Standards. The authors of this paper developed software that provides calculations according to I.S.C.I.R. Standards (Romanian Standard). CALCCOL software is a real help for the specialists in this field, significantly reducing their work time and work volume.

Keywords: dimension, height, diameter, pressure, temperature, load.

B.14. MAINTENANCE MANAGEMENT FOR A BOTTLING LINE

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Abstract. Maintenance is essential to ensure continuity of productivity to produce high-quality products and to maintain the the company competitiveness. For a better understanding of the problems, in the first part of the paper, theoretical considerations on maintenance activity are presented. Also, the components of the studied bottling line and their functionality are presented. It is well known that the maintainability of a product can be determined by watching the product behavior of customer and the organization of "technical databases". The establishment of such a database was the basis for maintenance activities study for a bottling line Maintenance team created a database on maintenance which helped them to identify the causes of defects. Knowing the causes of defects, it was the possible realization of an action plan with organizational measures (preventive maintenance) for involved departments, given performing under optimal conditions of

maintenance activities. This paper presents the stages of identifying the causes of defects, the measures included in maintenance plan management and the results of applying this plan.

Keywords: reliability, maintainability, defects, register of damages.

B.15. PHYSICAL-MECHANICAL CHARACTERISTICS OF STEERING WHEEL COVER LEATHERS

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Abstract. The steering wheel is among the important components of a vehicle, through it having full control over its direction. It is made of a metal base covered with a polymeric material. To improve the look and feel of a steering wheel, usually it is covered by leather. Choosing the material for covering the steering wheel must be done responsibly, because depending on the material, it can provide a certain type of comfort for the driver's hands. Thus, the current work aims to evaluate the durability and wear resistance of different types of leather used in automotive steering wheels. A series of tests were performed on leather samples before and after exposing them to special conditions (high/low temperature, humidity, UV) like tensile strength and elongation, tear strength, tear load, surface softness, color fastness and flex resistance. All the tests were performed according to actual standards in ICPI accredited laboratory. The results of the experiment showed that the durability and wear resistance varied significantly, depending on the type of leather. Overall, the study provides valuable insights into the characteristics of various types of leather and can help future research involved in developing more durable and long-lasting steering wheel cover leathers.

Keywords: steering wheel cover leather, physical-mechanical tests, special conditions.

B.16. TRANSMISSION BELTS PERFORMANCE IN NORMAL AND HEAVY-DUTY CONDITIONS

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Abstract. The main purpose of this article was to study the behavior of vehicle transmission belts in conditions similar to real ones, which can appear during their use. Transmission belts can be classified into several categories, but depending on their function, can be belts that work in dry conditions or immersed in oil. In this study, were analyzed both types of transmission belts. The samples were subject to different physical-mechanical tests: determination of hardness, density, thickness, abrasion, flex resistance, tensile strength and percentage extension and also to various conditions like, high and low temperature, immersion in liquids (oil, toluene, diesel). All the tests were performed before and after exposure, according to actual standards in ICPI accredited laboratory. Microscopy studies were done before and after the exposure to various factors, to appreciate the damage degree. Also, chemical-specific analyses were made for determining the transmission belt's composition. The findings from this study provide important insights into the behavior of transmission belts under different operating conditions.

Keywords: transmission belts, physical-mechanical tests, chemical analyses.

B.17. BIODEGRADABLE POLYMER COMPOSITE BASED ON POLYVINYL CHLORIDE AND WOOD WASTE. REALIZATION AND CHARACTERIZATION

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Abstract. This paper presents the development and characterization of biodegradable polymer composites based on polyvinyl chloride (PVC) and wood waste (WW). Wood waste resulting from wood processing into finished products is cryogenically ground at sizes of min. 500 nm, mechanically functionalized at temperature with polydimethylsiloxane (PDMS) (7 %) and mixed into a composite in varied proportions (10, 20, 30, 50 %). This composite will be made into a low-density product, with low cost, recovery and reuse of waste, and last but not least, biodegradable. The methodology for making the new materials involves the following steps: sorting waste, grinding, processing and compounding. These operations are easy to manage and do not involve new equipment. Compounding, the most important operation, will be carried out on an extruder - granulator and mixtures will be processed into finished products by injection. Tested biodegradable composites were structurally and physically mechanically characterized. The new materials will be used in making footwear soles by injection. Waste transformation (ground and processing) in new value-added products will lead to remarkable improvements in the life cycle of raw materials and the sustainable use of this waste, contributing to sustainability, improving eco-efficiency and economic efficiency and reducing the "pressure" of waste on the environment.

Keywords: wood waste, polymer composite, polyvinyl chloride.

B.18. EVALUATION OF THE ACTION OF THE ROLLER ON WEAKLY COHESIVE SOILS IN THE STATIC COMPACTION PROCESS

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Abstract. The paper evaluates the action of the roller on weakly cohesive soils in the static compaction process by quantifying the stiffness coefficient of these soils, carried out in different phases of the technological process. Aspects are presented that highlight the dependence of specific parameters on the compaction process with significant importance in the appropriate selection of the compaction technology. This results from an optimization criterion between the necessary quality of compaction, the efficiency of using the roller to achieve the imposed technological task and the general economic efficiency of the technological compaction process (by choosing the technological work scheme, the speed of compaction for each pass made, according to the project technical work).

Keywords: weakly cohesive soils, static compaction process.

B.19. INVESTIGATION OF THE EFFECTS OF THE ADDITION OF TITANIUM DIOXIDE (TIO_2) NANOPARTICLE FUEL ADDITIVE IN COTTON BIODIESEL ON ENGINE PERFORMANCE

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Abstract. The importance of renewable fuels as an alternative to fossil fuels is increasing due to environmental problems such as the decrease in the reserves of fossil fuels, their presence in certain regions, air pollution and global warming. Two important parameters of biodiesel fuel, which is one of these fuel types, such as high viscosity and density, negatively affect its use. One of the ways to overcome this negative situation is to improve the fuel properties by adding nano-fuel additives into biodiesel. In this study, titanium dioxide nano-fuel additive was added to biodiesel obtained from cottonseed oil at the rates of 50 ppm and 75 ppm. Specific fuel consumption, BTE, and cylinder pressure values, which are the basic performance parameters of the fuel mixtures, were determined in a single-cylinder engine at 1800 rpm at 4 different engine loads. Thanks to the thermophysical properties of the titanium dioxide fuel additive, the combustion reaction has improved. It was determined in the study that it positively affected the engine performance and fuel economy.
Acknowledgment: This study was supported by Research Projects Coordination Unit of Nigde Omer Halisdemir University with ref. number FMT-2020/1 BAGEP and MMT-2023-YEDEP. The authors thank to Research Projects Coordination Unit of Nigde Omer Halisdemir University for their supports.

Keywords: combustion, biodiesel, titanium dioxide (TiO_2), NPs, engine performance

B.20. AHP-BASED METHODOLOGY FOR CHOOSING INDIVIDUAL PROTECTIVE EQUIPMENT

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Abstract. It is a known the fact that in both the Member States of the European Union and the United States, the provision of Personal Protective Equipment (PPE) to workers who are carrying out their activity in different sectors is done by existing legislation and regulations specific to each state. However, choosing a suitable PPE for a particular workplace is a difficult task to perform given that there are a variety of PPE on the market that perform, in different ways these functions: to prevent an accident - from the same place of work. to protect the health and safety of workers and to minimize damage from any possible accident. Comparing the alternatives, to find the most favorable protective equipment specific to a particular workplace, is a complex multi-criteria decision problem that sometimes is difficult to solve. In this paper we approached a method of multi-criteria analysis of the decision, respectively we applied an Analytical Hierarchy Process (AHP) to select PPE -favorable to a certain job: mechanical locksmith. Our work allowed us to find the dominant criteria and the critical factors in the evaluation of the product, multi-criteria evaluation AHP of employees' requirements, regarding PPE and ergonomic aspects. It is a known fact that in both the Member States of the European Union and the United States, the provision of PPE to workers who are carrying out their activity in different sectors is done by existing legislation and regulations specific to each state. However, choosing a suitable PPE for a

particular workplace is a difficult task to perform given that there are a variety of PPE on the market that perform, in different ways these functions: to prevent an accident - from the same place of work. to protect the health and safety of workers and to minimize damage from any possible accident. Comparing the alternatives, to find the most favorable protective equipment specific to a particular workplace, is a complex multi-criteria decision problem that sometimes is difficult to solve. In this paper we approached a method of multi-criteria analysis of the decision, respectively we applied an Analytical Hierarchy Process (AHP) to select PPE - favorable to a certain job: mechanical locksmith. Our work allowed us to find the dominant criteria and the critical factors in the evaluation of the product, multi-criteria evaluation AHP of employees' requirements, regarding PPE and ergonomic aspects.

Keywords: personal protective equipment, analytical hierarchy process.

B.21. STUDY THE PHYSICAL CHARACTERISTICS OF RED RADISHES THROUGH THE PENETRATION METHOD

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Abstract. Texture is an important index of agro-food product quality and refers to those qualities that can be felt or analyzed. Fruits and vegetables have different textures and the evaluation of texture involves measuring response when it is subjected to mechanical forces such as cutting, shearing, chewing, compressing or stretching. The proprieties texture of agro-food products is important for: assessing a product's resistance to mechanical shocks, such as mechanical harvesting of fruits and vegetables, determining the resistance to deformation of products undergoing processing, transport and storage, determining the mechanical behavior of a food product when consumed. In this study, the physical characteristics of red radishes root under different storage conditions were analyzed by the instrumental method of objective analysis - the penetration test. The physical parameters analyzed by the penetration/compression test, through which the texture of red radish roots can be characterized, are: assesses skin strength/toughness and elasticity, buoyed point and resilience, the ripening and softening profile and the firmness of the underlying flesh.

Keywords: instrumental texture analysis, physical characteristics, penetration force, storage condition.

C. OPTIMIZATION IN ENVIRONMENTAL ENGINEERING AND ENVIRONMENTAL PROTECTION

C.1. ENVIRONMENTAL AND ENERGY EFFICIENCY OF A SELECTED MUNICIPAL WASTEWATER TREATMENT PLANT

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Abstract. Based on the analysis of the environmental and energy efficiency of the selected wastewater treatment plant (with the mechanical and biological treatment of wastewater, it was found that the highest BOD_5 concentration of 3,583 mg/dm^3 occurred before wastewater treatment The work of WWT was characterized by variable efficiency of the treatment process, which was shown by fluctuations in the results of three chemical indices, including COD, P and N An increased average concentration of total nitrogen, 80 mg/dm^3 occurred with an underestimated reduction of pollution at a level not exceeding 90 The energy consumption of 1.58 kWh/m^3 associated with the increase in the treated wastewater, together with the increase in average N concentration of 80.39 mg/dm^3 indicates the need to improve the process of removing nutrients from domestic and economic wastewater.

Keywords: energy efficiency| municipal wastewater| treatment plant.

C.2 WIND AND TEMPERATURE PATTERNS WITHIN URBAN RELIEF

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Abstract: Urban areas can create unique wind and temperature patterns, along with humidity and precipitation distribution, which are collectively referred to as the 'urban microclimate'. This is because urban areas have more buildings, roads, and other man-made structures that absorb and re-emit heat, which lead to higher temperatures compared to surrounding rural areas. Air temperature is also influenced by the pollution level either directly, given the greenhouse effect of the aerosols, but also indirectly, through cloud cover. In terms of wind patterns, tall buildings and road infrastructure within urban areas can redirect air circulation, either intensifying or lowering wind speed, creating or appeasing air turbulence. This paper presents some results of the analysis concerning the influence of anthropogenic urban relief on wind and air temperature in specific areas of Galati, a middle-size town in Romania. Measurements were performed along a well-known boulevard in the city, for a total of 7 locations along this street with a rectilinear and approximately horizontal profile. It was found that air temperature varied even by 5 degrees at the same moment of the day from one measurement point to another, mainly because of road traffic, while wind speed varied rather chaotically from one location to another, being the lowest in the most open location, where buildings located further influenced the least air circulation.

Keywords: wind, temperature, urban microclimate, traffic.

C.3. EVALUATION OF NOISE LEVEL IN AN WORKING ENVIRONMENT

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Abstract. The paper analyses the noise level conducted at a company that produces ice cream. It is in Bacau City and currently owns a production area, in which it operates. There were performed measurements of the noise level generated by the production equipment's in the two halls of the company, the production hall, and the packaging hall. Noise level measurements were carried out for three days, and for each monitoring point 3 measurements lasting one minute were carried out. The values of noise level obtained were mediated and graphically represented, then the noise maps for the two enclosures were made. According to the obtained results, can be concluded that the noise level values recorded in the evaluated working environment do not exceed the maximum allowed values.

Keywords: distribution noise level, control, monitoring, equipment's, acoustics maps.

C.4 STUDIES ON THE BIOACCUMULATION OF MERCURY IN THE PLANT SPECIES OF TYPA LATIFOLIA

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Abstract. The main objective of the current research is to determine the bioaccumulation of the mercury from the soil in the case of Typa Latifolia plant type. The results obtained from the experimental determinations show that the bioaccumulation capacity of mercury depends on the distance from the water-soil interface from which the plant samples were taken, concentration of mercury in the soil, historical soil pollution, and the chemical and biological properties of the soil. The experimental results show that in the case of the plant species Typa Latifolia , a very high bioaccumulation of mercury was recorded. The plant species Typha Latifolia was found to be very good at bioaccumulating mercury, showing that it can be used in soil phytoremediation processes, particularly in phyto-extraction and phyto-stabilisation processes for the removal of mercury from contaminated soils.

Keywords: mercury, bioaccumulation, Typha Latifolia.

C.5. THE USE OF $COFe_2O_4$@HAP SORBENT FOR THE DEGRADATION OF CONGO RED DYE FROM AN AQUEOUS SOLUTION

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Abstract. The $CoFe_2O_4$@HaP nanocomposite (HaP-Hydroxyapatite) was synthesized by coprecipitation method, with the aim of being used in Congo Red dye removal processes from aqueous solutions through adsorption processes. The synthesized material was characterized by Fourier Transform Infrared Spectroscopy (FT-IR), X-ray Diffraction (XRD). The textural parameters could be identified by analyzing the N_2 adsorption/desorption isotherms and by measuring the BET (Brunauer-Emmett-Teller) specific surface area and the magnetic properties were investigated by the VSM technique. The FT-IR spectra indicated the presence of metal-oxygen bonds in ferrites, but also specific hydroxyapatite bonds. The results obtained from XRD confirmed the cubic spinel structure of cobalt ferrite (Fd-3m) as well as the hexagonal structure of hydroxyapatite (P63/m). The BET specific surface area value for the nanocomposite was 34 m^2/g. Following the measurements of the magnetic properties, a saturation magnetization of 34.83 emu/g and a coercivity of 0.03 kOe were obtained. Adsorption studies of Congo Red dye on the sorbent of $CoFe_2O_4$@HaP resulted in an adsorption capacity of 15.25 mg/g. The reusability of the material as an adsorbent for the chosen dye was also evaluated. The results showed an adsorption capacity of 10.22 mg/g after three adsorption/desorption cycles thus confirming the possibility of reusing the $CoFe_2O_4$@HaP sorbent for the degradation of the Congo Red dye.
Acknowledgments: This work was supported by a grant from the Romanian Ministry of Education and Research, CNCS-UEFISCDI, project number PN-III-P4-ID-PCE-2020-1385, within PCNDI III.

Keywords: magnetic nanoparticles, hydroxyapatite, adsorption.

C.6. IMPLEMENTATION OF THE CIRCULAR ECONOMY CONCEPT IN THE FRAMEWORK OF A RETAIL COMPANY WITH CONSTRUCTION MATERIALS

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Abstract. The concept of the circular economy represents the latest attempt to conceptualize the integration of economic activity and environmental well-being in a sustainable way. The circular economy replaces the linear approach based on resource exploitation, unsustainable production, and consumption with a circular, sustainable approach with benefits for economic, social and environmental capital. The present work presents a study about the implementation of the principles of the circular economy according to Governmental Decision no. 943/2022 regarding the National Strategy of the circular economy and the Action Plan regarding the circular economy for Romania. The study was carried out within a company whose business profile is the retail of construction materials and Do-It-Yourself (DIY) interior design products. The cross-sectoral areas that are subject to the implementation of the principles of the circular economy and that have been analyzed within the association are represented by waste and water/wastewater. Thus, clear directives were developed regarding the implementation of circular economy principles regarding the waste sector. For example, the RETURO system will be implemented for plastic waste, which

represents approximately 75% of the total amount of waste generated by society. In the water sector, action plans have been developed regarding sludges from oil/water separators and oily waters from oil/water separators.

Keywords: circular economy, waste, water, RETURO.

C.7. DETERMINATION OF THE TOTAL SUSPENDED SOLIDS CONTENT AND THE AMOUNT OF WASTE RETAINED BY THE SCREENING INSTALLATIONS

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Abstract. The calculations were done for a wastewater treatment plant that had mechanical, biological, and sludge processing stages and served a population of about 11,100 people. Domestic wastewater, storm water, and industrial water collected from businesses that release into the sewage system are all treated at the treatment plant. The STAS 6953-81 method was used in this research to determine the total suspended matter content. The purification plant's efficiency in removing these substances was assessed using measurements taken from both the influent and effluent. The quantities of coarse material (by weighing) retained from the sewage treatment plant using the two types of screens were also determined. It was observed that the efficiency of the treatment plant was over 98%.

Keywords: wastewater, treatment plant, suspended solids, screening.

C.8. ECO-LABELLING IN THE CONTEXT OF THE CIRCULAR ECONOMY

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Abstract. Environmental degradation, climate change are real threats in today's world. Promoting the concept of a zero-pollution, circular economy is the way to a green future. As regards the production and consumption of products and services in the context of the circular economy, this involves: efficient use of raw materials, limiting waste generation, CO_2 emissions, the use of hazardous chemicals and the development of sustainable products that are easy to repair and recycle. In this context the use and development of eco-labelling is one of the essential tools offering producers and consumers the alternative to produce and live more sustainably. The paper presents a study on the evolution of eco-labelled products at EU level from 2010 to 2023 (March). Thus, the number of eco-labelled products at EU level is 75.80% compared to 2010 and 57.62% compared to 2013. 2367 licenses are granted at EU level of which 47 licenses (2%) are granted in Romania.

Keywords: circular economy, ecolabel, sustainability, products, consumers.

C.9. HABITAT PRESSURE AND PLANNING OF GREEN SPACES IN THE CITY OF KINSHASA, DRCONGO

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Abstract. The present study aims to improve the living conditions of the population of kKinshasa by bringing back greenery in its urban environment. The increase in the urban population leads to an uncotrolled extension of the city. In Kinshasa, in many neighborhoods, for lack of other sources of energy, wood is used as fuel by the majority of households. Kinshasa consumes 5 million tonnes of wood per year, which would come from the exploitation of around 60,000 hectares of natural peri-urban forests », CIRAD pointed out in 2018. In the urban environment, the subdivision is the basis of the disappearence of the green spaces that the city had. The result shows that, in recent years, the city has lost several of its green spaces (Zamba Thérèse, Zamba Voka, Zamba Eucalyptus, Zamba Weather, Zamba People's Palace, the forest massif of Bandalu,gwa), which allowed absorption of CO_2. In general, the total area of plant cover has decreased by 41%. This area goes from 55.25 ha to 32.69 ha, i.e. a loss of 22.56 ha. In view of this situation in the city, we had to propose the « Educate-Preserve-Restore-Develop approach which could help bring greenery back to the urban environment. The present study aims to improve the living conditions of the population of kKinshasa by bringing back greenery in its urban environment. The increase in the urban population leads to an uncotrolled extension of the city. In Kinshasa, in many neighborhoods, for lack of other sources of energy, wood is used as fuel by the majority of households. Kinshasa consumes 5 million tonnes of wood per year, which would come from the exploitation of around 60,000 hectares of natural peri-urban forests. CIRAD pointed out in 2018. In the urban environment, the subdivision is the basis of the disappearence of the green spaces that the city had. The result shows that, in recent years, the city has lost several of its green spaces (Zamba Thérèse, Zamba Voka, Zamba Eucalyptus, Zamba Weather, Zamba People's Palace, the forest massif of Bandalu, gwa), which allowed absorption of CO2. In general, the total area of plant cover has decreased by 41%. This area goes from 55.25 ha to 32.69 ha, i.e. a loss of 22.56 ha. In view of this situation in the city, we had to propose the Educate-Preserve-Restore-Develop approach which could help bring greenery back to the urban environment.

Keywords: greenery, green space, habitat pressure, planning, urban area.

C.10. WATER - RESOURCE AND ENVIRONMENTAL FACTOR - OBJECTIVE OF SUSTAINABLE DEVELOPMENT

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Abstract. The present work aims to highlight its importance of water as a natural resource and environmental factor, for the life of Planet Earth, but also for the evolution and socio-economic existence of human communities. The main stages of awareness regarding the importance and role of water for the balance of the planet, for the maintenance of biodiversity, for a healthy life of consumers are reviewed. A corroboration is made between the objectives of Sustainable Development on a local and global level and the specificity of water from a quantitative and qualitative point of view, also highlighting the economic vision of water use. Of particular importance are the infrastructure elements that must be considered, in order to

reduce the multiple dysfunctions that are still manifesting, and the actions and activities that are requested to be promoted for the efficiency of this service of general interest in conjunction with the elements of urban ecology and elements of ecological reconstruction.

Keywords: clean water, sanitation, sustainable development, objective, indicators.

C.11. RESEARCH ON THE RECOVERY OF SOME AGRICULTURAL WASTE FOR MANUFACTURING OF COMPOSITE MATERIALS WITH CLAY MATRICES

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Abstract. The article describes the results of the research carried out for the systemic description of the manufacturing technological processes of composite materials with clay matrix and insert from agricultural waste. The objectives of these researches include the valorization of agricultural waste and cheap and abundant resources to obtain composite materials usable in civil constructions or various rural developments, with superior properties to existing ones, for example adobe or clay bricks. The article describes the materials used, the obtaining technology, the dependence between the output parameters and the input and control parameters.

Keywords: agricultural waste, composite materials, clay, technology.

C.12. CERAMIC COMPOSITE FILTERS – IMPORTANT ADVANCED SYSTEMS FOR DRINKING WATER PURIFICATION

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Abstract. The paper deals with the issue of advanced systems for separating pollutants from drinking water by means of filtering elements that have ceramic composite materials and activated carbon in their structure. These filter media are characterized by a high-water filtration capacity, as well as the possibility of rapid regeneration through unclogging, to restore the flow. Also, the paper highlights the results obtained following theoretical and applied research of some ceramic filters defined by a water purification unit, consisting of the housing, the filter cartridge, the connection piece to a water source, connecting hose and water battery for consumption (from the public network or from own / drilling sources). It is particularly noteworthy, the constructive particularities of the filter cartridge composed on the outside, of a ceramic material with two compact monobloc layers of tubular cylindrical shape and on the inside, of a concentric layer of activated carbon impregnated with silver ions (for the bacteriostatic effect) and with zeolites (for filtering heavy metals). Considering the need to obtain an increased efficiency of these ceramic filters due to its multiple major characteristics (filtration rate of 0.5 μm, retention of algae, rust, sediment, sand, sludge, as well as chlorine, taste and smell of water, reduction of turbidity , elimination of harmful bacteria in proportion > 99.9%), the possibility of use in various applications (household, industrial, medical, pharmaceutical, etc.) is emphasized, as well as the continuation of research in these directions.

Keywords: filtration, ceramic composites, active carbon, silver ions.

C.13. BIOGAS - ANAEROBIC FERMENTATION OR COMPOSTING?

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Abstract. Anaerobic fermentation and composting are two essential processes in the treatment of animal manure from livestock farms, wastewater and the management of household waste and municipal biomass, as they reduce the negative impact on the surrounding environment. The paper will focus on presenting the two processes and analysing them comparatively. At the same time, the advantages and disadvantages of using each will be explained.

Keywords: biogas, anaerobic fermentation, composting.

C.14. SEM ANALYSIS OF POLYPROPYLENE FILTER CARTRIDGES USED IN DRINKING WATER PURIFICATION SYSTEMS

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Abstract. In recent years, emphasis has been placed on the use of home filtration systems. The (Polypropylene) PP filter cartridge is one of the rarest in these systems, with the role of retaining impurities in drinking water. Through this study, a clear view of the structure and morphology as well as the retention capacity of the impurities present in the PP filter cartridge is provided. In the paper, the results obtained from the investigation of the surface of the PP filter material are presented. An analysis of the degree of impurity retention was also carried out using the (Scanning Electron Microscope) SEM analyzer. For this, the PP filter cartridge was prepared according to the steps mentioned in this paper. Based on the analysis, an uneven distribution of impurities on the surface of the PP fibers was identified. The level of impurities varied with the depth of the cartridge. So, the identified chemical elements: Al, Si, Na, Cl, Ca, Fe and S are the most common on the surface of PP fibers. With the help of the SEM analyzer, it was possible to identify a number of 15 impurities.

Keywords: filter cartridge, polypropylene, Scanning Electron Microscope, impurities.

C.15. LONG RANGE TRANSPORT ANALYSIS BASED ON EASTERN ATMOSPHERIC CIRCULATION AND ITS IMPACT TO THE DUST EVENT OVER MOLDAVIA, ROMANIA IN AUGUST 2022

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Abstract. During the second half of August 2022, a dust transport was observed over the eastern region of Romania, that originated from the dry regions of Kalmyk steppe and the Precaspian plain. The dry soil in these regions was most likely eroded by wind due to the severe drought over a long period of time, which was accentuated by early heat waves in May and June 2022. This episode was the result of the dominant easterly circulation caused by the extension of East European high to the northeast of the continent, which transported the dust towards eastern part of Romania for more than 2 days. The torrential rains that occurred in this region between August 22 nd and 24 th did not clear the atmosphere of dust, since this was continuously carried into the region by the intense easterly circulation. The dust event was captured by the Modis satellite images, which also detected smoke trains originating from fires in the north of the Sea of Azov, but these did not reach the atmosphere of Romania. To determine the trajectory of the particles, the Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model was used in this paper. The Ensemble median model was used to highlight the presence and concentration of dust in eastern part of Romania. The aerosols were detected between 0 and 4 km, according to radar and ceilometer data of the REXDAN cloud remote sensing facility in Galați, Romania. The synoptic context of that period kept the aerosols captive in the lower troposphere of this region.

Keywords: dust transport, air pollution, eastern atmospheric circulation, aerosols.

C.16. ECOLOGICAL STIMULATION OF THE GERMINATION OF SOME AGRICULTURAL CROPS WITH THE HELP OF CARBON CLUSTERS AT LOWER PRESSURE THAN THE ATMOSPHERIC ONE

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Abstract. The demand for organically produced food is steadily increasing, enhancing interest in environmentally friendly agriculture and healthy food. The objective of this work was to investigate the effect of the ecological stimulation of wheat and maize seeds with composite material based on C 20 -C 60 carbon nanoclusters under low pressure vapour conditions. The seeds of agricultural crops were collected from the harvest of 2022, which were kept under standard conditions. In comparison with the control group, a reduction in the germination period and a 35% higher germination capacity for the treated lots is obtained.

Keywords: germination, growth stimulation, composite material.

C.17. MICROSTRUCTURAL AND FT-IR ANALYSIS OF SOME RAW BIOMASS USED AS SOLID BIOFUELS

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Abstract. Vegetal biomass is a renewable raw resource with significant industrial applications, and several studies are focused on developing and improving this category of fuels. The calorific value of biomass is determined by its chemical composition, especially the calorific value of structural components and extractives. Vegetable residue from plantations and trees has not been significantly utilized for energy purposes due to a number of limitations, with logistics being the most significant. This article focuses on examining the morphological structure and characteristics of three typically cultivated biomasses in Moldova, on both the left and right banks of the Prut River: lean, white buckthorn, and miscanthus. Utilizing scanning electron microscopy (SEM Quanta 200 3D), X-ray analysis (Xpert PRO MPD), and FT-IR, the biomass was evaluated accordingly. All wood samples were subjected to a chemical examination that included the morphological aspect and the measurement of extractive compounds, lignin concentration, and hemicellulose content.
Acknowledgement: This research was funded by the Joint Operational Programme Romania—Republic of Moldova 2014–2020, grant number 2Soft/1.2/44 BCS Ro-Md cross-border grant project "Improving the quality of solid biofuels produced from raw material collected from both sides of Prut river", financed by ENI CBC.

Keywords: SEM analysis, XRD analysis, FT-IR analysis, vegetal biomass.

C.18. PRACTICAL APPROACH IN THE TREATMENT OF MUNICIPAL SLUDGE BY USING ORGANIC POLYMERS

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Abstract. By composition, the sludge from wastewater treatment can create problems both in the treatment phases and in the processes of valorization and/or elimination. Another important aspect of the sludge management problem is the handling of the quantities and methods of their treatment. Although there are several methods available for treating and eliminating sludge, many of them are expensive and can be difficult to implement in practice. In addition, there is a need to develop new technologies and methods to cope with the large volumes of sludge generated regularly. Among the most used methods in sludge treatment is the application of organic flocculants. The application of organic flocculants in sludge treatment has several benefits. First, they can improve the efficiency of the phase separation

process, thus reducing the time and costs required for sludge treatment. Second, the use of organic flocculants can reduce the negative impact on the environment. Although they are chemical substances, most organic flocculants are safer for the environment than inorganic flocculants, especially considering the integration into agriculture of larger quantities of sludge according to new European policies. This study examines the laboratory and industrial-level application of organic flocculants to highlight the best solutions for reducing chemical substance quantities, obtaining the best phase separation solutions, and reducing costs.

Keywords: municipal sludge, organic polymers.

C.19. STUDIES ON THE POSSIBLE USE OF AERIAL DRONES IN AGRICULTURE

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Abstract. The use of drones in agriculture brings major benefits for farmers, the most important being the obtaining of overview images of agricultural crops, the collection of data much faster and more efficiently than by traditional terrestrial methods, allowing them to see and monitor in real time the state of vegetation of crops, determine areas requiring irrigation and last but not least can monitor the existence of pests. The software used can generate high-precision images and maps to determine specific areas where farmers can intervene according to cultivation technologies.

Keywords: drones, vegetation indices, multispectral photogrammetry, LiDAR system.

C.20. ASPECTS REGARDING THE YEAST GROWTH ISOLATED FROM FERMENTED PROBIOTIC PRODUCT AND FROM GRAPE POMACE

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Abstract. Yeasts are valuable organisms for the food industry and fermented beverages. They can be easily grown in the laboratory. This study aims the following objectives: isolation in the laboratory of yeast strains from a fermented probiotic product such as kefir and from grape pomace; the evaluation of their growth on culture media, macroscopic morphological colony characteristics and microscopic aspects of the isolated strains. The culture media used were: glucose broth (GB), peptone water (PW), Sabouraud dextrose agar (SDA). The behavior of yeasts isolated from the above mentioned products was investigated by the Ostrovski's method and by the methylene blue reduction method. Cultural aspects on culture media (shape, colour, size) and microscopic aspects of isolated strains (morphology, staining) were evaluated. Macro and microscopic observations made on yeast strains isolated from a commercial fermented product (kefir) and from grape pomace belong to the genus Sacharomyces sp. Their behaviour evaluated by the Ostrovski's method differentiates the strain with a high fermentation capacity as the one isolated from kefir.

Keywords: yeast, Saccharomyces sp., kefir, pomace grape.

C.21. MBR PILOT PLANT APPLICATION IN THE TREATMENT OF WASTEWATER FROM MEAT PRODUCTION

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Abstract. Wastewater from meat production can create significant environmental issue due to the large volumes generated and the presence of organic matter, nutrients pathogens etc. The main sources of wastewater in meat production are generated from the cleaning of facilities and equipment. The wastewater can contain high levels of organic matter, nitrogen, phosphorus, and pathogens, which make it challenging to treat and dispose of safely. To reduce the environmental impacts of wastewater from meat production, various treatment technologies can be used, such as physical, chemical, and biological treatment methods. These technologies aim to remove pollutants, reduce nutrient levels, and disinfect the water before discharge into the environment. The present study tried to evidence some possibilities to apply the MBR technology in the meat production wastewater treatment. The pilot is equipped with analytical sensors (pH, conductivity, temperature, dissolved O_2, temperature etc. in order, to find the optimal aeration of the MBR/optimal dosage of H_2O_2, based on the operation process and time set. The valuation of the key parameters of the wastewater were used in the instigation period (COD, BOD, pH etc.), measurement performed by using the operation and investigation plan.

Keywords: MBR pilot plant, wastewater, meat production.

C.22. ANALYSIS OF THE HOUSEHOLD WASTE MANAGEMENT SYSTEM AND THE HEALTH AND ENVIRONMENTAL IMPACT IN THE MUNICIPALITY OF KASA VUBU, CITY OF KINSHASA IN THE DEMOCRATIC REPUBLIC OF CONGO

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Abstract. One of the important areas in the interaction between human and environmental activities is waste management. In low-income countries, in this case the Democratic Republic of Congo in general and the city of Kinshasa in particular, the most common method used is uncontrolled dumping. However, if this solution is the easiest to implement and the least expensive, it is nonetheless necessary to respect certain rules to achieve its goal, which is very rarely the case. Throwing away garbage in inappropriate places can be extremely damaging to the environment and to human health. Within the framework of this study, observations, interviews and surveys conducted in the field with local populations as well as the sampling of physico-chemical parameters with the help of the EXTECH portable Multi-analyzer, model 433201, have determined several obvious nuisances such as odors, fumes, proliferation of insects, attraction of mice and dogs. And several diseases have been noted by the presence of this pirate dump, namely, 67 % of the population suffers from malaria, 17 % suffers from amoebic dysentery, 10 % from typhoid fever and 7% from diarrhea. This

situation is particularly due to the absence of evacuation of uncontrolled dumps; the population is not better informed about the hygienic standards in terms of waste management; the absence of transit sites for the deposit of household waste; the absence of a sorting and recycling center; the lack of awareness of the population of the danger that threatens them due to the omnipresence of uncontrolled dumps; the lack of intervention and monitoring of public and municipal services in the field and the lack of political will for the establishment of waste management structures. These are the problems faced by household waste management in the city of Kinshasa in general and the commune of Kasavubu in particular. It should be noted that this analysis has focused much more on the physico-chemical analysis of the pirate landfill, unlike the study on the Management of household waste in the city of Kinshasa: Survey on the perception of inhabitants and proposals, where we had just focused on the perception of the population of the city of Kinshasa in relation to solid waste management.

Keywords: management system, household waste, health, environmental impact.

C.23. CO-COMPOSTING OF SEWAGE SLUDGE WITH BIOPESTICIDE MICRO-ORGANISMS TO ENRICH THE BIODIVERSITY OF ACID SOILS IN CAMEROON

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Abstract. Faecal sludge management in Cameroonian cities is a very important socio-sanitary and environmental issue in the daily lives of populations. It is with the aim of contributing to a better management of these excreta, that a study was carried out from September 2022 to April 2023. The objective of the present work is based on the use of a biotechnological technique to transform the waste of faecal sludge into an organic amendment through the action of biopesticide microorganisms to enrich the biodiversity of acid soils in Cameroon. To this end, it was a question of determining the physicochemical and microbiological characteristics of faecal sludge to highlight important characteristics as a raw material; and then to identify these microorganisms by morphological, biochemical and molecular tests. Preliminary results showed that faecal sludge is slightly basic (average pH = 7.4) and contains high concentrations of organic substances, minerals and helminth eggs. The average values of total organic matter and total Kjeldahl nitrogen obtained were around 54.04 %; 0.9 %, respectively. As far as concern helminth eggs, 326 eggs/L were counted. As for the identification of microorganisms, the Bacillus thuringiensis strain, a gram-positive bacterium and biocontrol agent was isolated and characterized using morphological and microscopic studies.

Keywords: co-composting, faecal sludge, biopesticide microorganisms, biodiversity, acid soils.

D. MECHATRONICS & ROBOTICS

D.1. PREDICTION OF RESIDUAL STRESS DISTRIBUTION AFTER TURNING OF MAGNESIUM ALLOY

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Abstract. Magnesium alloys are widely used in the aerospace industry due to their physicochemical properties and good workability. The behavior of magnesium alloys in the machining process makes finite element analysis a good starting point for simulations in two directions: Cost reduction and safety (avoiding possible accidents due to ignition of magnesium chips in contact with humid air). This work aimed to determine how different machining parameters (machining speed, feed rate, machining depth) affect the quality characteristics of a magnesium alloy machined by turning. A special analysis software was used to perform these analyses - Advantedge 7.5. To obtain a more detailed overview, 3 different parameters were varied: machining speed between 1000 and 5500 m/min, feed rate between 0.5-1 mm/rev, and depths of cut between 0.75 and 2 mm. The results show that the use of high speeds and feeds leads to high residual compressive stresses in the surface layer. It is also found that the depth of cut and feed, as well as the interaction between feed and depth of cut, have the greatest influence on residual stress distribution and cutting force.

Keywords: turning, FEM, magnesium alloy.

D.2. INTEGRATING NEURAL NETWORKS INTO SHEET METAL FORMING: A REVIEW OF RECENT ADVANCES AND APPLICATIONS

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Abstract. Sheet metal forming is a widely used manufacturing process for producing parts with complex shapes and geometries. It involves various operations such as bending, stretching, drawing, spinning, and coining, where a sheet of metal is plastically deformed into shape. Some challenges such as high tooling cost, limited formability, and spring back make it a complex process. In recent years neural networks have emerged as powerful tools for solving complex problems in various domains. Neural networks extract useful features and patterns without requiring explicit rules. This paper reviews the recent advances and applications of neural networks in sheet metal forming. It covers topics such as defect detection, quality prediction, process optimization, and inverse design. It also discusses the benefits and limitations of this technique and provides future research directions.

Keywords: neural network layers, sheet metal forming, spring back compensation.

D.3. MACHINE LEARNING, MECHATRONICS, AND STRETCH FORMING: A HISTORY OF INNOVATION IN MANUFACTURING ENGINEERING

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Abstract. This paper presents a historical overview of the development and application of machine learning, mechatronics, and stretch forming in manufacturing engineering. Machine learning is the field of computer science that deals with designing and implementing algorithms that can learn from data and improve their performance over time. Mechatronics is an interdisciplinary field that integrates mechanical, electrical, electronic, and computer engineering to create intelligent systems and products. Stretch forming is a metal forming process that involves stretching a sheet or a profile over a die to create complex shapes with high accuracy and quality. A general overview of the origins and evolution of these three fields is presented, highlighting their contributions to the advancement of manufacturing engineering. The last section indicates current challenges and opportunities for further research and innovation in these fields, as well as their potential impact on the future of manufacturing engineering.

Keywords: advanced manufacturing, machine learning applications, human-machine interaction

D.4. IOT AND SUSTAINABLE AGRICULTURE

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Abstract. This paper presents a historical overview of the development and application of machine learning, mechatronics, and stretch forming in manufacturing engineering. Machine learning is the field of computer science that deals with designing and implementing algorithms that can learn from data and improve their performance over time. Mechatronics is an interdisciplinary field that integrates mechanical, electrical, electronic, and computer engineering to create intelligent systems and products. Stretch forming is a metal forming process that involves stretching a sheet or a profile over a die to create complex shapes with high accuracy and quality. A general overview of the origins and evolution of these three fields is presented, highlighting their contributions to the advancement of manufacturing engineering. The last section indicates current challenges and opportunities for further research and innovation in these fields, as well as their potential impact on the future of manufacturing engineering.

Keywords: IoT, sensors, agriculture, sustainable development

D.5. SYSTEM SCADA FOR WATER TREATMENT

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Abstract. The modernization of water treatment needs performing monitoring and control systems. The paper presents a study case concerning the utilization of the SCADA system (Supervisory Control and Data Acquisition) for the water supply of a city. There are analyzed the needed steps for water treatment and the automation control performed through the SCADA technology for correction of the qualities of raw water. The paper underlines the time reaction, the efficiency, and the material economy determined by the modernization of the treatment plant. Appearing in the mid-1960s, SCADA systems have been perfected over time, being used in the most varied industries, from chemistry, and energetics to the nuclear field. The efficiency and reliability of the system were improved by using a specific programming language as SQL and web-based applications. The system allows real-time collection of data and decisions. In the case of water treatment, the information is collected through pressure and level sensors, electronic flow meters, transducers, PLCs, etc. The paper analyses the structure and components of the treatment steps and the SCADA monitoring and control system.

Keywords: water treatment, SCADA, sensors

D.6. THE BIPOLAR STEPPER MOTOR CONTROL SYSTEM USING THE ARDUINO MEGA 2560 DEVELOPMENT BOARD

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Abstract. This paper presents a control system for a bipolar stepper motor made with the Arduino Mega 2560 development board. This development board contains 54 digital input/output pins of which 14 provide PWM signals. The control system of the bipolar stepper motor consists of the power supply, the bipolar stepper motor, the driver, the speed transducer, Laptop. The electrical diagram of the control system was made in fritzing. The author developed a program for controlling the stepper motor in the Arduino IDE programming environment. The implementation and validation of the program for controlling the bipolar stepper motor were carried out in the Laboratory of Electrical Machines of the Faculty of Engineering in Bacau. Following the experimental determinations, it was found that the control system of the bipolar stepper motor ensures the performances imposed by the design theme. The bipolar stepper motor control system can be used in the construction of industrial robots or positioning systems.

Keywords: bipolar stepper motor, Arduino Mega 2560 development board

D.7. HUMS CONCEPT FOR SUSPENSION SYSTEM OF HIGH MOBILITY WHEELED VEHICLE

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Abstract. The paper introduces the concept of operation of a HUMS for the suspension system of a high mobility wheeled vehicle. The basic principles of the system and its structure are clarified. The main benefits for operators of the maintenance system after the implementation of the system into vehicles are presented. Preliminary ranges of loads generated in the suspension system of a vehicle with a GVW of 3.5T are presented, as well as measures for measuring loads in the form of forces and moments.

Keywords: High mobility wheeled vehicle, durability, suspension, CBM, HUMS, maintenance system

D.8. INTEGRATED CONCEPT OF ANALYSIS - OPTIMIZATION - SIMULATION OF THE BEHAVIOR OF MECHANICAL SYSTEMS

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Abstract. As the complexity and competitiveness requirements of products increase, design and production times are reduced, conditions in which the realization and testing of physical prototypes become major impediments. It is thus necessary to implement techniques based on modeling & simulation in a virtual environment, which can ensure greater performance and product quality using only a fraction of the time and cost required in traditional approaches. By using various categories of commercial software (CAD - Computer Aided Design, MBS - MultiBody Systems, FEA - Finite Element Analysis, DFC - Design for Control), complex virtual models can be created, going as far as the faithful modeling of both the product components and of the specific operating conditions. This approach also allows the rapid testing of numerous geometric-constructive variants, in order to optimize the behavior. In this context, the paper proposes the presentation of a platform that integrates software solutions specific to the evaluation of the form, assembly (assembly), functionality and durability of mechanical and mechatronic systems. Such an approach also allows the performance of energy and/or economic efficiency studies as the case may be, as well as the forecasting - management of the life cycle of the system. The use of modeling & simulation software platforms in the analysis and optimization of mechanisms (mechanical systems) offers special advantages, which focus on reducing costs and design-development time, simultaneously with increasing quality (operational performance of mechanical systems). Among the critical success factors regarding the implementation of the modeling & simulation solution in a virtual environment can be pointed out: the well-defined process, system-level orientation, effective goal setting, fast simulation dynamics, high-quality infrastructure. Unfortunately, there are also a number of limiting factors that make it difficult to apply this solution, such as insufficient schooling, which has the effect of a reduced number of specialists in the field, process change in companies, which requires time for accommodation, high initial costs for the implementation of platforms modeling & simulation in a virtual environment, both for software solutions (in particular, configurations/commercial licenses) and for the necessary hardware infrastructure.

Keywords: modeling & simulation software platforms, fast simulation dynamics, geometric-constructive variants.

D.9. STUDY ON PROBLEMS RELATED TO OPTIMAL OPERATION OF TOOL MAGAZINE OF NUMERICALLY CONTROLLED MACHINE TOOLS AND THE ANALYSIS OF THEIR DYNAMIC BEHAVIOR

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Abstract. The objectives of the present paper were focused on the development of a methodology that allows the judicious choice of the values of some constructive-functional parameters, already from the design phase, in order to achieve an optimization of the parameters of the actual mechanical structure for handling, as well as for regulating the driving couplings, i.e. of the hydraulic drive system The main advantage of processing centers - increasing productivity - is mainly achieved by reducing the auxiliary, non-productive time, but absolutely necessary for the proper development of the process of the technological process The main targeted components of this auxiliary time are, on the one hand, the time affected by changing the tool and adjusting it - or the toolholder - in the main shaft, and on the other hand, the time spent changing the position of the part being processed, or even of the part to be processed.

Keywords: modeling & simulation software platforms, fast simulation dynamics, geometric-constructive variants.

E. ECONOMIC ENGINEERING

E.1. MARKETING RESEARCH REGARDING CONSUMER SATISFACTION FOR THE ELECTRICITY SUPPLY SERVICES OFFERED BY SUPPLIERS IN ROMANIA

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Abstract. The year 2021 brought the liberalization of the electricity market, which was carried out under conditions regulated by ANRE, the authority that establishes, elaborates and monitors the application of a set of mandatory regulations at the national level. This assembly is necessary for the operation of the sector and the electricity market. Although many consumers are reluctant when it comes to switching suppliers, they should know that they can benefit from certain advantages and better costs regarding the supply of electricity. In the case of household consumers, the liberalization of the electricity market means more options for various services that are associated with advantageous prices. On the other hand, providers can offer consumers multiple service packages, with or without a subscription, customized. Through this personalization of the package of services offered, the provider pays more attention to the requests and needs of consumers. What is happening today on the electricity market does not satisfy the consumers, after the liberalization, the prices are increasing a lot. As a result of this increase, the draft law was adopted that provides for the capping of energy prices and the compensation of bills from November 1, 2022. Identifying what matters to consumers and what drives their behavior is a major advantage and leads to the creation of growth opportunities, the development of electricity companies and the creation of successful strategies. The paper presents a marketing research that aims to obtain information on the problems faced by consumers, the attitude of customers, the degree of satisfaction and the quality of services offered by suppliers.

Keywords: marketing research; consumer satisfaction; electricity supply.

E.2. THE IMPACT OF AGILE SYSTEMS ON THE ROLE OF THE PROJECT MANAGER IN AN IT COMPANY

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Abstract. The paper carries out an analysis of the impact of Agile systems in an IT company from Cluj-Napoca, by highlighting the way of working in the company during the period when the teams were organized according to the traditional Waterfall methodology and the way in which the transition to the Agile methodology was made. This way of working is meant to change mindsets, make people embrace change, always be open to the new and unpredictable, and always ready to face any challenge from the outside and beyond. The role of the manager nowadays is increasingly difficult to define, especially in an IT company where the environment is constantly changing, but this will be a challenge in determining what his duties are and how he is affected by the culture it is imposed by Agile systems in the company he leads. The results obtained by the company were analyzed through the lens of six performance indicators: project scope, project planning, project budget, team satisfaction, client satisfaction and overall project quality.

Keywords: performance; IT; Agile systems; manager.

E.3. FDI AND ECONOMIC GROWTH IN ROMANIA

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Abstract. This paper aims to present the impact of foreign direct investment (FDI) inflows in promoting economic growth in Romania. The studies carried out so far show that, in many countries, there is a positive, rather than neutral or negative, relationship between FDI inflow and economic growth, especially in developing countries. In Romania, after 1990, except for a few years of crisis or pandemic, the evolution of FDI was positive. This upward trend of FDI inflow has positively reflected to a good extent the development and economic growth of Romania. Unfortunately, this growth was not uniform throughout the country. The more developed regions attracted more foreign direct investment and developed faster than other regions that attracted less foreign direct investment.

Keywords: foreign direct investment; economic growth.

E.4. FACE-TO-FACE VERSUS ONLINE OR HYBRID: HOW STUDENTS PERCEIVE THE EDUCATIONAL FRAMEWORK

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Abstract. In the aftermath of the recent pandemic, it became more and more important for the educational system to account for the necessity of designing program studies that could deliver the courses both in an onsite environment and in an online framework. The aim of our study is to investigate the perceptions of students about the face-to-face, online and hybrid methods of delivering lectures. In order to analyze the extent to which universities may include in their curricula the online framework of courses, we consider that it is of interest to investigate the effects of adopting the online course during the Covid pandemic and the impact of this change on the students' results. In this respect, we conduct a survey to explore the way students have perceived this change. Our survey is conducted on a sample of students enrolled in the third year and fourth year of study at the Faculty of Engineering from "Vasile Alecsandri" University of Bacau. We have collected a number of 122 responses and the results show that, if they could choose, 52% of the students would choose the hybrid framework and 36% of them would choose to have the possibility of online courses and face-to-face seminars. Moreover, approximately 76% of the students are working and have worked during the pandemic and the possibility of a mixt approach towards delivering lectures is seen as a higher chance to participate to them, without the necessity to physically attend the courses. Our results contribute to the literature that analyze the effects of the pandemic on the educational system, but they also offer some insights regarding the discussion about digitalization that was even more promoted after the outbreak of the Covid pandemic.

Keywords: online course; distance education; face-to-face learning; hybrid learning; higher education.

E.5. GENERAL AND SPECIFIC ASPECTS OF CIRCULAR ECONOMY IMPLEMENTATION

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Abstract. This paper wants to present the progress registered in the implementation of the circular economy. The transition to a circular economy is essential to ensure sustainable development and a rational use of natural resources. Currently, the countries of the EU are world leaders in promoting the transition to the circular economy. In order, to evaluate the approach towards a circular economy of each EU country, several indicators were proposed by the European Commission, grouped into 4 major areas: Production and consumption, Waste management, Secondary raw materials and Competitiveness and innovation. From the point of view of these indicators, Romania is at a low level of implementation of the circular economy compared to the other EU states. However, in Romania, there is a constant progress regarding the implementation of the circular economy.

Keywords: Circular Economy; implementation indicators; sustainable development.

E.6. THE IMPACT OF COVID PANDEMIC ON SMES: EVIDENCE FROM CENTRAL AND EASTERN EUROPE

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Abstract. The 2008 financial crisis have affected by a large extent the small and medium enterprises all over the world. Companies implemented different measures to overcome the negative effects of the crisis. While some of them struggled to find ways to survive, there are firms which disappeared from the market. Ten years after this event, the outbreak of the Covid pandemic found the economic environment in which SMEs operate in a fragile state, newly recovered after the financial crisis. Faced with this new crisis, companies had to design strategies that could overcome the lockdown, while continuing their activity. Also, firms had to offer their employees the possibility of working from home and to develop the technical and the IT infrastructure in order to meet the new requirements regarding the digitalization or the necessity of implementing strategies for digital marketing. The aim of our study is to review the literature regarding the impact of the Covid-19 pandemic on the activity of SMEs, with a focus on the factors that shape the relation between the outbreak of the pandemic and the financial and economic performance of firms. Also, we conduct an empirical analysis regarding the effects of the pandemic on the economic performance of small and medium enterprises form Central and Eastern Europe. Our study contributes to the growing literature that analyze the effects of the pandemic on the activity of SMEs.

Keywords: pandemic; entrepreneurship; SMEs; economic performance.

E.7. EVOLUTION OF RENEWABLE ENERGY GENERATION IN EU27. A DECOMPOSITION ANALYSIS

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Abstract. The present paper analyses the evolution of renewable energy generation in the European Union through a decomposition analysis based on the Index of Decomposition Analysis together with the Logarithmic Mean Divisia Index within the EU27 between 2000 and 2020. A four factors decomposition approach is considered for decomposing the total RES generation and a five factors model is employed to decompose the carbon emissions. Furthermore, a focus on wind and solar photovoltaic generation is introduced through a four factor decomposition calculated in the period 2010-2020. The most influential factors affecting the RES generation trend in the period 2000-2020 results are the RES share which determined an increase of 1841 TWh and the energy efficiency which determined a decrease of 635 TWh. Variations of carbon emissions are mostly affected by the energy intensity, namely the amount of energy necessary to produce one unit of GDP, which determined a reduction of 1040 Mt. Through the decomposition analysis, the paper successfully identifies the drivers supporting RES development and controlling carbon emissions, thus adequate policy measures can be designed to reach planned targets.

Keywords: Index decomposition analysis; renewable generation evolution; carbon emissions; additive decomposition.

E.8. DIGITIZATION OF INDUSTRIAL PRODUCTION CHAINS

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Abstract. In the present paper will be discussed the national situation of industrial development in Romania compared with the current trends at European and international level and digitization of the production chains. Digitization is the transformation process of the information in a digital form. It is essential to know the advantages of this process in order to bring Romanian`s production to the next level. With the digitization comes benefits that will be highlighted in this paper. We will also analyze what methods can be applied and implemented for digital development in the industrial production chains at the national level with examples of companies where this transition has already been a real success.

Keywords: industry 4.0; digitization; development; production; industry; digital; success.

E.9. DEVELOPMENT OF A HAND ORTHOSIS FOR THE CORRECTION OF THE FINGERS POSTURE OF PEOPLE WITH RHEUMATOID ARTHRITIS USING 3D PRINTING TECHNOLOGY

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Abstract. In this paper we will analyze how people suffering from rheumatoid arthritis can be helped with the new 3D printing technologies. Rheumatoid arthritis is a chronic inflammatory autoimmune condition that affects the joints in hands. To help these people, an orthosis concept will be developed to correct the posture of the fingers using 3D printing technology, based on a 3D model made in a designed software. 3D printing is a process of forming a three-dimensional solid object of any shape, made through an additive process.

Keywords: 3D printing; orthesis; development; arthritis; 3D modelling.

E.10. VISUAL ANALYSIS OF MACROECONOMICS INDICATORS FOR ESTABLISHING HIERARCHIES OF INFLUENCE AND PREVISION POSSIBILITIES

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Abstract. The current technological and economic requirements oblige managers to quickly determine and apply some decisions based on analyzes that provide, just as quickly, conclusions and scenarios. In this sense, the current paper uses an open source platform, in which algorithms and techniques are applied that analyze macroeconomic indicators, as the objective of the paper is to determine some hierarchies of influence of some data (investments, production) on other data (production, GDP). Possible regression-based predictions are also used. The results of the research establish a hierarchy of influence sizes that can be considered as a basis for action in order to impact the GDP.

Keywords: GDP, investment, manufacture, visual analysis, prevision.

E.11. ESTABLISHING AN ARCHITECTURE FOR AN ARTIFICIAL NEURAL NETWORK FOR MODELING MACROECONOMICS INDICATORS

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Abstract. The use of artificial intelligence has become indispensable in making decisions in order to obtain and maintain a competitive advantage. In this sense, finding the most efficient architectures and forms of AI are essential. The objective of this paper is to determine, with a view to the subsequent application, an architecture of the artificial neural network (ANN), based on the results of testing and validation of the training process. Using feedforward the artificial neural network, with ReLu and Adam functions, on macroeconomics indicators, the most fitted ANN was revealed for future use.

Keywords: GDP, investment, manufacture, visual analysis, prevision.

E.12. NEURAL NETWORKS - A DIRECTION OF INTELLECTUAL CAPITAL ANALYZED IN INDUSTRIAL ORGANIZATIONS

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Abstract. Intellectual capital is the secret to the success of this millennium. Using it wisely is the key to success in the knowledge-based society, it can be seen as a hidden value of an organization until recently immeasurable. A specific footprint of intellectual capital in developing competitive ability and gaining the strategic advantage of an organization is the use of competitive intelligence. The main purpose of this paper is to make an analysis of the use of neural networks in management, especially to present the current state of unconventional technologies - used in organizations with industrial activity, more precisely we will refer to SMEs in the North -East of the country that shows a great interest in the solutions offered by this new trend of the current era - the use of neural networks. In the context of achieving the above-mentioned goal, related to the use of neural networks, as a support in developing strategic solutions for the development of SMEs in the North-East of the country and the knowledge-based economy, we will make a presentation of specific unconventional technologies. of the knowledges economy, as smart management becomes a pressing necessity imposed by the use of information as a strategic resource based on two main pillars: organizational culture and understanding of the process.

Keywords: neural networks, intelligence, intellectual capital, knowledges economy, unconventional technologies, strategic advantage of organizations.

E.13. ECONOMIC CONSIDERATIONS IN OPTIMIZING THE RESPONSE IN THE EVENT OF A CAR ACCIDENT

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Abstract. In Romania the S.N.A.U. system (Unique National System for Emergency Calls) is an emergency telephone system implemented in 2005. This system is activated when the intervention of specialized agencies is necessary, to ensure immediate assistance in situations where the life, integrity or health of the citizen is endangered, public order, public or private property or the environment. At present, Romania is at the bottom of the ranking in Europe regarding the number of car accidents and the cost of human lives. Purpose: S.N.A.U. it was launched nationally following an investment of 40 million euros and had as its main supplier the Swedish company Ericsson, which delivered the software application and the equipment necessary to connect call centers and dispatch agencies. Having an essential role in the protection of the population, the system still has limitations in managing to the maximum the resources necessary for an effective modern response in the case of complex traffic accidents. This article will propose a new digitalized integrated management approach and maximizing the resources available locally in the event of an accident. The new digitalized integrated management will use the data collected directly from the field with the help of drones as well as new technologies such as eCall, ANPR (Automatic Number Plate Recognition), databases provided by insurance companies, etc. The new system will be based on the current SNAU system, giving a new meaning to the term modern and digital, never seen before in Romania. The use of the new integrated digital management system will be able to lead to the implementation of a new system of auctions between third-party car assistance providers at the local level as well as instant digital damage notifications to the insurance companies whose vehicles were involved in the incident. A rapid, almost

instantaneous optimal management in certain cases will lead to a significant decrease in financial costs and in saving human lives. This type of approach will allow studies on traffic safety from the perspective of the vehicle, the human factor and the environment.

Keywords: Romanian Emergency Platform; traffic management; auctions; eCall; ANPR.

F. CHEMICAL & FOOD ENGINEERING

F.1. IONIC LIQUID MEDIATED PETRACTION FOR VITAMIN C

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Abstract. In the attempt to develop new technologies to replace fossil-based resources with renewable ones, vitamins biosynthesis production has received increased attention. Pertraction is a membrane extraction process, where two liquid phases are contacted through a liquid membrane. The desired species in the feed phase (solute), selectively crosses the membrane into the stripping phase, and has been applied for separation of carboxilic acids, vitamins and antibiotics. Vitamin C, also called ascorbic acid, is one of the best known and most studied vitamins, being biosynthesized by microbial, plant and animal organisms, with the exception of primates and guinea pigs. It is one of the most important vitamins, essential in human nutrition with uses in medicine and food. Pertraction of vitamin C through bulk liquid membranes (BLM) was investigated using a liquid membrane with phosphonium ionic liquid IL-104, which is an effective extractant of vitamin C. The analysis of the facilitated pertraction of vitamin C, through a liquid membrane made of heptane and Cyphos IL103, highlighted the major role of the pH gradient between the aqueous phases, the concentration of the carrier in the organic phase and the mixing intensity of the aqueous phases. Thus, in order to achieve the maximum initial and final mass flows of vitamin C, the pertraction must be carried out at $pH_i = 3$ and $pH_s > 11$, concentrations of Cyphos IL in the liquid membrane above 80 g/l, under conditions of intense mixing of the aqueous phases.

Keywords: vitamin C, Cyphos IL103, pertraction.

F.2. THE ORIGIN AND TREND OF ORANGE WINES

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Abstract. Orange wines are an interesting hybrid of red and white wines that embody some of the structure and tannins normally found only in red wines, as well as the freshness and fruitiness of white grapes. Prolonged contact of the must with the skin results in a variety of unusual aromas: overripe fruit or herbs, hay and chamomile. In this paper, the origin and trend of orange wines were analyzed, as well as the potential of the local market to integrate this type of wine, but also the influence of sustainability and durability in strengthening the creation of biodynamic wines. The research was focused on the analysis of the local white grape variety Viorica from the Purcari area, which analysed the grapes and wine obtained from the 2020 and 2022 harvests. Orange wines are produced according to red wine technology, i.e. with fermentation - maceration of the grape must. During fermentation the sugar content evolution was determined. After obtaining the wine raw material, the organoleptic properties were analysed and the main parameters were determined, which showed that they correspond to the documents in force. Profiling of wines produced in different vintage years was also carried out. The sales chart of Viorica "Orange" for 2022

was analyzed and it has been noticed that Moldova is the segment with wines that is promoted both for export and on the domestic market

Keywords: grapes, maceration – fermentation, diagram, orange wine, Kvevri, amber wine, local market, external market, sales.

F.3. OXIDATION AND MARKERS OF WINE OXIDATION

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Abstract. Wine is a dynamic system whose redox balance evolves throughout production and maturation. One of the main factors regulating the balance of this system is the presence of oxygen; the redox potential makes it possible to measure the level of oxidation or reduction of this system at any stage of evolution. Oxygen can alter the composition and quality of must and wine by participating directly or indirectly in different chemical or biochemical reactions. Phenolic compounds in wine are generally highly reactive with oxygen and potentiate its action. This reactivity, amplified by the presence of redox metal couples strongly influences the formation or disappearance of the components of aromas and taste of wines. The excess, as well as the oxygen deficiency, may be the origin of the evolution of the organoleptic characteristics of the wine, depending on the nature and quantity of the newly formed or degraded products. Thus, wine management includes as an essential component the continuous supervision of redox processes, which can directly influence its quality. The redox processes lead to changes in the quality of the wine, as well as the markers of these processes.

Keywords: wine, redox potential, redox mechanisms, oxygen, markers of oxidation, reduction processes.

F.4. CHICKPEA AND LENTIL AQUAFABA - A FOAMING AGENT FOR THE MANUFACTURE OF FASTING CONFECTIONERY PRODUCTS

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Abstract. The fast is an important period in the life of Orthodox Christians. People try to adapt to this period in order not to feel the lack of certain types of food. In this context, it is necessary to develop new technologies for the manufacture of fasting confectionery products. Currently, various non-traditional plant materials are used to increase the confectionery products biological value and to widen the fasting foods range so that they are accessible to more consumer's categories. Fasting confectionery products can be obtained by replacing foaming agents of animal origin with those of plant origin. Legume cooking water (aquafaba) is a viscous liquid, an important source of soluble protein that can be applied as a foaming agent in the manufacture of fasting confectionery products. Chickpea and lentil cooking water obtained under laboratory conditions were used for the research. Aquafaba quality indices (sensory, physicochemical) and technological properties (foaming capacity, foam and emulsion stability) were determined. The production technology of sponge cake and fasting marshmallow was developed. The quality indices characteristics of

these fasting products were in accordance with the in force normative documents. The possibility of replacing the foaming agent of animal origin (eggs) with one of plant origin (aquafaba) for the creation of a new range of fasting confectionery products were demonstrated.

Acknowledgments: The author would like to thank the Moldova State Project no. 20.80009.5107.09 "Improvement of food quality and safety by biotechnology and food engineering", running at Technical University of Moldova.

Keywords: chickpea and lentil aquafaba, foaming agent, foaming capacity, foam and emulsion stability, fasting confectionery products, quality.

F.5. STUDIES ON THE HERBICIDAL EFFECT OF A BIPYRIDINIUM DERIVATIVE AND THE EVALUATION OF ITS IMPACT ON SOME AQUATIC ORGANISMS

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Abstract. Nowadays, the use of pesticides is a necessity in intensive agriculture. But, their use must be done with professional and social responsibility, according to certain rules, which if not observed lead to environmental pollution. Herbicides are environmental contaminants that after use in agriculture, aquatic ecosystems are entered. These contaminants can enter the food chain and can cause problems for aquatic organisms, and even for humans. Paraquat (PQ) is a nonselective herbicide that is used worldwide and has been demonstrated to be a high risk to aquatic organisms. In view of the already proven toxic effect of paraquat on aquatic organisms, and its ban on use in many countries of the world, including in the countries of the European Union, it is of interest to replace this herbicide by substances with similar herbicide properties but with lower toxicological effects. Therefore, the current paper presents the studies carried out on the herbicide effect of a quaternary bipyridinium salt (N,N-bisphenacyl-4,4'-bipyridinum dibromide), synthesized by us, on the *Xantium Strumarium* species, annual dicotyledonous weed present especially in cereal plantations. The species *Triticum aestivum* (wheat) has been used as a biological indicator of the toxicity of this compound to plants and crops. A study on the toxicological effects of this bipyridinium dicuatenary compound on the development of golden carp embryos (*Carassius auratus*) and of zebrafish larvae (*Danio rerio*) were also carried out. The 4,4'-bipyridinium salt applied pre-emergently had a moderate influence on the *Xanthium species*, compared to the positive control. The effect of the post-emerging action of bipyridinium salt is little noticeable after just 5 days after administration, but after 15 days, it can be clearly seen that the weeds were destroyed. *Triticum aestivum* plants were not significantly affected by the administration of the bipyridinium compound. Regarding the aquatic ecotoxicology study, reporting the obtained results in the experiment to those presented in the literature on paraquat toxicity, it can be concluded that the studied bipyridinium salt has a lower toxicity than the related compound Paraquat. This may be due to the different chemical structure of the studied compound, which presents more voluminous phenacyl and hydrophobic substitutes that make it harder to penetrate the cell of this compound than the methyl substitutes of paraquat.

Keywords: bipyridinium salts, herbicides, paraquat, aquatic toxicology.

F.6. LOCAL YEASTS ISOLATED FROM CIMIȘLIA WINE CENTER AS A WINEMAKING PERSPECTIVE OF THE REPUBLIC OF MOLDOVA

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Abstract. The yeasts responsible for alcoholic fermentation in winemaking usually get in the must from the surface of the grapes, the equipment used or by direct administration of specific yeasts. Currently active dry yeasts (ADY) are widespread in many countries, by using of which excellent results are obtained. Recently, there has been an increased interest regarding the use of local yeast isolated from the fermented must, which possess certain specific metabolic characteristics that ensure the authenticity and specificity of the wine (distinctive organoleptic characteristic). The purpose of this paper relies on the quantification and selection of indigenous flora from the Ștefan Vodă wine-growing region in order to produce experimental dry white and red wines. For scientific purposes, the study was carried out on the berries and grape must microflora of white varieties (Fetească Regală, Muscat and Traminer) and red varieties (Pinot Noir and Cabernet-Sauvignon). As a result, pure cultures of local/indigenous yeast strains were isolated and selected from the "Cimișlia" wine region. The microscopic study allowed the selection of 24 pure cultures of the genus Saccharomyces for further technological studies. Microscopy of the samples revealed yeasts of the eukaryotic type in which the cellular components are well distinguished, they have different shapes and sizes, etc. The use of these pure species in the production of experimental white and red wines allowed to obtain experimental qualitative and highly organoleptically valued wines, furthermore, the dynamics of the must fermentation process is similar to that achieved by industrial active dry yeasts. The isolated local yeasts were appreciated as a valuable biological material, recommended from a winemaking perspective, they contribute to obtaining quality wines that respect the personality and aromatic potential of the grape varieties.
Acknowledgments: The authors would like to thank the Project TC "Valorificarea florei indigene din regiunea viti-vinicolă Ștefan Vodă în vederea creșterii autenticității și competitivității vinurilor moldovenești", cofounded by the National Agency for Research and Development of Moldova and conducted at department of Oenology, Microvinification Center of Technical University of Moldova.

Keywords: local yeast, specific metabolic and technological characteristics, aromatic potential.

F.7. IMPACT OF CHEMICALLY MODIFIED STARCH ON BIOCHEMICAL PARAMETERS OF *IN VITRO* AND SPONTANEOUS FLORA OF *BASIL SP.*

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Abstract. Bioplastics are used in the food sector for packaging manufacturing and in the medical sector for numerous medical and biomedical applications. The use of bioplastics in agriculture is a promoter. This study presents the biochemical parameters of *Basil sp*. from *in vitro* culture and spontaneous flora. For *in vitro* culture were used potato starch and chemically modified potato starch, as principal substrate. In order to stimulate the grow of *Basil sp.* were used for the *in vitro* experiments, phytohormones as indoleacetic acid-IAA,

indole-3-butyric acid-IBA and benzylaminopurine-BAP. The source of spontaneous flora of *Basil sp.* was Bacau, Romania. The biochemical investigations realised on *Basil sp*. using Thin Layer Chromatography and the UV-Vis spectrophotometry showed that the production of assimilating pigments is influenced by growth and lighting conditions of plants, but also by growing substrate.

Keywords: bioplastics, pigments analyses, extraction plants.

F.8. VALORIZATION THE RESIDUAL BIOMASS OF SACCHAROMYCES PASTORIANUS IN DYNAMIC BIOSORPTION PROCESSES

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Abstract. Utilizing industrial byproducts to produce materials with added value is supported by recent EU documents, national reports and statistics, as well as recent international scientific research studies that highlight the growing importance of environmental protection and preserving human life quality in today's society. By immobilizing residual microbial biomass (RMB), an industrial by-product, and investigating its potential to be used as a biosorbent in biosorption procedures to retain some chemical pollutants in wastewater, new value-added bioproducts that utilize the by-products have been created industrial. A new residual biomass of *Saccharomyces pastorianus* (*S. pastorianus*), an interspecies hybrid between *Saccharomyces cerevisiae* and *Saccharomyces eubayanus* is the subject of this study's investigation into its biosorptive capabilities. *S. pastorianus* waste biomass from the brewing process was immobilized in sodium alginate and employed in a batch method to biosorb reactive Brilliant Red HE-3B textile dye from aqueous solution. The effects of different experimental parameters such as biosorbent amount, dye concentration and column flow rate were investigated. The experimental biosorption data were used in a first step, to draw the breakdown curves and highlight the influence of these parameters on the retention efficiency of the dye on the studied biomass. The results obtained re-confirm the results obtained in a static regime, that the residual biomass studied can be considered a good biosorbent in dynamic systems to be used in the treatment of wastewater containing small amounts of organic dyes.

Keywords: biosorption, dynamic process, residual microbial biomass, reactive dye.

F.9. RETENTION EFFICIENCY OF DYES FROM THE FOOD INDUSTRY ON ORGANO-INORGANIC MATRICES

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Abstract. In the food industry, synthetic dyes have a harmful effect on food products, humans and environment. Their replacement with natural dyes is an increasingly accentuated trend in the last period, their retention remaining an impediment. There are certain materials capable of retaining such dyes (such as polymers through their encapsulation, or other organic substances), but those that have a promising effect, are organo-inorganic matrix type materials. The aim of our study is to highlight the retention efficiency of some dyes from the food industry such as: Malachite Green (MG), Methylene Blue (MB) and Sunset Yellow FCF (SY), on the organo-inorganic matrix of the gelatine-clay type. The raw material used in the synthesis of the hybrid materials is commercial clay K-10, and the complexing was done with a gelatine-type colloid. The synthesis conditions were adapted from the literature, thus obtaining a material suitable for the retention of dyes. The absorption process was carried out in a batch system. Confirmation of the adsorption mechanism was tested by FTIR analysis. The remarkable result was obtained in the case of retaining the Malachite Green dye at a concentration of 10^{-4} M, the adsorption efficiency being 98% after testing with the UV-Vis spectrophotometer. Perspectives are thus opened for the optimization of synthesis parameters in order to obtain hybrid materials used in the retention of industrial dyes.

Keywords: clay, gelatine, Malachite Green, Methylene Blue, Sunset Yellow FCF, adsorption efficiency.

F.10. BREWING WITH SORGHUM AND SORGHUM MALT

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Abstract. Currently, barley or wheat is utilized as the primary raw materials for malting in the production of beer. The high starch/protein ratio of these grains is one of the many benefits of utilizing them for brewing that are well known. In order to produce gluten-free beer, it is becoming more and more popular around the world to substitute barley or wheat malt with other raw materials, including rice in Asia, maize in America, millet and sorghum in Africa, etc. The paper proposed the use of sorghum and sorghum malt in different proportions as raw materials for brewing beer in pilot station conditions through a classical technological process from which beer is obtained from barley malt. For the finished product beer, the following physicochemical analyzes were performed according to standard procedures: original extract (% m / m), alcohol content (% v / v, % m/m), density (g/cm^3), turbidity, turbidity S25/S0, turbidity S90/S0), pH, colour, bitter value. The sensory analysis of the beer samples was conducted using a 9-point hedonic scale. The attributes evaluated for each beer sample were: colour, appearance, aroma, bitterness, general taste, carbonation, mouthfeel, body and general acceptability. According to the results obtained the beer made

from 60% sorghum and 40% sorghum malt was satisfactory in terms of aroma, mouth feel, carbonatation, bitterness, and the rest of analysed sensory characteristics. The acquired results show that by simply adding enzymatic preparations to speed up the mashing and filtration of wort, the researched raw materials can be used effectively in the production of gluten-free beer.
Acknowledgements: The work of the author Marius Eduard Ciocan was supported by the project "PROINVENT", POCU/993/6/13-Code 153299, financed by The Human Capital Operational Programme 2014–2020 (POCU), Romania.

Keywords: gluten-free beer, unconventional raw material, pilot scale, sorghum beer

F.11. STUDY ON USING SPENT GRAIN TO PRODUCE FLOUR PRODUCTS

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Abstract. Throughout the whole food chain, from the raw material (after harvest) to the retail level, 14% of food products are lost or wasted. Food waste causes significant environmental degradation in addition to economic losses; for instance, it contributes to about 7% of the world's total greenhouse gas emissions. Additionally, food waste is a significant obstacle to enhancing global food security, particularly in light of the fact that by 2050, the world will need almost 60% more food to feed its expanding population. Due to this, it is essential to decrease food waste throughout the food supply chain and identify sustainable solutions for food security. As a by-product of the brewing industry or as a result of the production of distilled alcoholic beverages, spent grain is produced year-round in large quantities at a low cost, which is advantageous. Spent grain is typically utilized as animal feed, however because of its valuable chemical composition (rich in proteins and fibers), it is hoped to use it to produce fortified food products. In our research we utilized residual spent grain from the brewing and malt whiskey industries. With the inclusion of spent grain, both by-products, which are high in fiber and protein, can improve the functional value of the finished products. The investigations were based on the utilization of spent grain in the production of pasta, wafers, and a variety of gingerbread. It is ideal for use in flour products since the degree of consumer acceptability was quite high, averaging up to 15% spent grain. The recipes for flour-based items created as a result of the research show that there are practical possibilities for recycling spent grain into new, inexpensive foods with added value.

Keywords: brewing, distilled alcoholic beverages, by-products, functional products.

F.12. FRUITS ROLLS ENRICHED WITH GRAPE POMACE POWDER - SENSORY EVALUATION AND CONSUMER ACCEPTABILITY

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Abstract. The present research represents a continuation in finding innovative solutions for the valorization of wastes from the food industry. According to International Organization of Vine and Wine, Romania is an important wine producer, ranked 5th in European Union countries in 2022. Thus, the wastes from wine industry represent an important environmental issue at national level as well as worldwide. Therefore, the concern for the grape pomace

reuse becomes a significant part of our research, in an attempt to find new solutions for its valorization in different fields. Grape pomace is well known as being extremely rich in dietary fiber, lipids, polyphenolic compounds (tannins, anthocyanins and flavones). It represents a valuable source of natural antioxidants and could be used for its nutritional properties. The objective of the present work is the valorization of grape pomace by introducing it as a functional ingredient in powder form, thus developing an innovative food product. Fruit rolls also known as fruit leathers are dehydrated fruit-based products, often eaten as a snack or dessert, which can represent an interesting alternative to replace conventional candies or dried fruits. Most fruit rolls are obtained by mixing fruit puree and other ingredients or additives like sugar, pectin, citric acid, glucose syrup, and then dehydrating its under specific conditions. In this view, in the present study, fruit rolls were prepared from apples and bananas, with the addition of grape pomace powder as a functional ingredient. The product also contains honey and lemon juice. After establishing the recipe and preparing the fruit rolls, sensory analysis was carried out to evaluate the degree of consumers' acceptability through the hedonic scale method. Dehydrated apple and banana fruit rolls, with the addition of grape pomace powder, represent an innovative food product with a high degree of acceptability, a great nutritional value and health benefits.

Keywords: grape pomace, functional ingredient, health benefits, fruits rolls.

F.13. EXTRACTS OF BLACKCURRANT BERRIES POMACE - *IN VIVO* INVESTIGATION

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Abstract. Blackcurrant berries are known to be rich in polyphenolic compounds, which have been demonstrated to be potent antioxidants and cardioprotective agents. High amounts of these compounds remain in the by-products (pomace) resulting from the production of blackcurrant juice. Several studies have indicated the possibility of using polyphenol-rich extract from blackcurrant pomace to beneficially modulate the key markers of the health status of a consumers' body. Studies on the genotoxicity of extracts of natural sources and cytotoxicity tests, using plant test systems in vivo, such as *Allium cepa*, which were validated by several researchers, can provide information on the possible therapeutic indications of plants extracts. The present work aims to conduct an *in vivo* investigation of blackcurrant berries pomace extracts. In this view, aqueous and hydroethanolic extractions from blackcurrant berries pomace were carried out. The extracts were spectrophotometrically evaluated using Shimadzu Spectrophotometer UV-1280. The content of total polyphenols was also determined by the Folin-Ciocalteu method. Further, in vivo investigation of blackcurrant pomace extracts was achieved using *Allium cepa* test. Onion bulbs were placed in tap water for 72 hours. Series of 3 bulbs onion were maintained to the four blackcurrant pomace extracts for 24 hours in a growth chamber LEEC, in controlled conditions. The length of the roots grown after immersion in water and respectively in extracts, was measured compared to the control. A microscopic evaluation of onion root-tips was completed using an optical microscope with 40x and 100x magnification. Different stages of mitotic division and several types of chromosomal aberrations were observed. After the preliminary results, since the cell division process does not seem to be affected, it can be mentioned that blackcurrant pomace extracts can be safely used for possible therapeutic purposes.

Keywords: *Allium cepa* test, *in vivo*, blackcurrant pomace, extract.

F.14. BIOCOMPOSITE MATERIAL BASED ON YEAST RESIDUAL BIOMASS AND NATURAL POLYMER AS ALTERNATIVE FOR SUSTAINABLE REMOVAL OF RIFAMPICIN FROM AQUEOUS MEDIA

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Abstract. Pharmaceutical residues have been identified in practically all environmental matrices on every continent over the last three decades, including the world's most pristine environments, the polar regions. Rifampicin (RIF) is one of the most effective broad-spectrum antibiotics against bacterial pathogens and is used as a first-line treatment for tuberculosis, as well as HIV, cancer, leprosy, and Alzheimer's disease. In addition, a recent study found that RIF can be utilized as both a prophylactic and therapeutic treatment for COVID-19 patients. Because of its environmental stability, good solubility in aqueous media, and poor bioavailability, RIF as an antibiotic contaminant cannot be entirely eliminated in conventional treatment systems. RIF that leakage into surface water, groundwater, and sediments has the potential to harm humans, aquatic life, and the environment by causing persistent toxicity and endocrine problems. As a result, it is critical to select an efficient, simple-to-use, cost-effective, and ecologically friendly solution to RIF removal. Only a few papers on the removal of RIF from wastewaters using either chemical, particularly advanced oxidation techniques, or biological methods have now been reported. In this study, biocomposite material was synthesized via immobilization of *Saccharomyces pastorianus* residual biomass in calcium alginate beads and evaluated for their ability to removal RIF from water matrices. Scanning electron microscopy (SEM) and Fourier-transform infrared spectroscopy (FTIR) were used to characterize the *Saccharomyces pastorianus* /calcium alginate composite matrix. The size of the beads and the point of zero charge were also determined. In a batch system, lab-scale biosorption studies were carried out. Biosorbent beads had a spherical shape, a diameter of 3.0485 ± 0.01003 mm, a point of zero charge of 6.7, and textural stability while being stored at 4°C in calcium chloride solution. To achieve good biosorption capacity, process parameters such as pH of initial solution, biosorbent dose, temperature and initial RIF concentration were optimized. The biocomposite beads showed a biosorption capacity between 0.4799 and 4.6946 mg/g at 21± 2°C, at the initial pH value of 5.0 and a biosorbent dose of 1.5 g/25 mL for initial RIF concentrations (5 ÷ 50 mg/L) range. *Saccharomyces pastorianus* residual biomass/calcium alginate composite beads were found to be a promising biosorbent for RIF removal from aqueous solution due to the biosorption capacity, low cost, and eco-friendly nature. This study provides a scientific basis for the sustainable removal of RIF by biosorption indicating that synthetized biocomposite material has great potential for practical applications.
Acknowledgments: This research is a sustainability result of a grant of the Romanian Ministry of Research and Innovation, CCCDI – UEFISCDI, project number PN-III-P2-2.1-PED-2019-1063, within PNCDI III.

Keywords: Rifampicin, *Saccharomyces pastorianus* residual biomass, natural polymer, biosorbent, biosorption, optimization.

F.15. *SAMBUCUS NIGRA L.*: CHARACTERIZATION OF ELDERBERRY EXTRACTS OBTAINED BY VARIOUS METHODS

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Abstract. Elderberry or black elderberry (*Sambucus nigra L.*) is a popular medicinal used since ancient times. Elderberries have complex chemical composition (bioflavonoids, anthocyanins, phenols, terpenes, glycolic aldehydes, etc.). The chemical composition indicates the potential use of elderberry in various industries that are related to pharmaceutical, cosmetic or functional nutritional products. The majority of elderberry components have therapeutic effects and can be used in the prevention and treatment of many diseases. The leaves have a laxative effect, the flowers have diuretic and diaphoretic effects, the fruits present vitaminizing and anti-neuralgic effects. The fresh flowers are used for elderberry syrup, and the dried ones for tea and poultices. Elderflower was considered the main antiviral treatment before the advent of chemical preparations. Due to the presence of many bioactive substances, in addition to the implications for our health, there is a growing interest in the use of elderberry in various fields, such as: natural additives in the food industry or biopesticides (antifungal and insecticidal) in the growth of crop plants. The present study aimed to obtain the aqueous and hydroalcoholic extracts from different parts of the elderberry (leaves and flowers), through classical and modern methods (maceration, ultrasound-assisted extraction, microwave-assisted extraction) and their physico-chemical characterization in order to evaluate the antifungal potential. Both the fingerprint of the UV-Vis spectra and the values of the measured parameters confirm the efficiency of modern eco-compatible methods (good extraction yield, time savings, reduced energy consumption) compared to classical methods.

Keywords: elderberry, extraction methods, physico-chemical characteristics, UV-Vis spectra.

F.16. UREASE ACTIVITY IN GINGER (*ZINGIBER OFFICINALE*)

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Abstract. Urease (EC 3.5.1.5), is a nickel enzyme that catalyzes the hydrolysis of urea into carbonic acid (H_2CO_3) and ammonia (NH_3), by forming carbamic acid (H_2NCOOH). Urease has an important role in the occurrence of N accessibility for plant growth in the N cycle and the widespread use of urea as a fertilizer. It is produced by bacteria, fungi, plants and invertebrates, where its occurrence is related to protein degradation. The mechanism of action of urease consists in the binding of three water molecules and a hydroxide ion trapped between two nickel ions. During the enzymatic reaction, urea replaces these three water molecules and joins the two nickel ions. Surrounded by a network of hydrogen bonds, it strongly activates the inert urea molecule, finally leading to the release of two ammonia molecules. Ammonia can cause the disruption of several metabolic functions in both microorganisms and animal and human kingdoms. The present study proposes the isolation of urea using ginger as a source. The choice of source was based on the antibacterial effect, but specialized literature does not report it as a source of urea. Two types of enzyme extracts

were prepared: aqueous and hydroalcoholic, of different concentrations (1:1, 1:2, 1:3). After calculating the enzyme activity, it was observed that the hydroalcoholic extract has the highest action for a concentration of 1:2, with a urease activity of 180 µmol urea/minute, compared to 125 µmol urea/minute for the aqueous extract. The obtained results reflect an increased enzymatic activity compared to other vegetable sources, which suggests an inhibitory potential on microorganisms, based on the protein degradation capacity.

Keywords: urease, ginger, urease activity.

F.17. INVESTIGATION INTO 3-FORMYL-RIFAMYCIN BIOSORPTION USING BIOCOMPOSITE MATERIAL BASED ON MICROBIAL BIOMASS AND NATURAL POLYMER

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Abstract. Over the past century, medicine has achieved major advances in terms of increasing life expectancy and decreasing morbidity. Currently, over 3000 chemical compounds have been approved as pharmaceutical product constituents by various regulatory agencies. The human body does not completely metabolized pharmaceuticals, and some of them are eliminated either unaltered or as metabolites. Pharmaceuticals are classified in the group of emerging contaminants (EC) and enter in various water systems through wastewater treatment plant effluents, sewage, industrial waste and improper disposal. Different technologies such as advanced oxidation processes, adsorption, electrocoagulation, membrane-based processes were applied for removal of pharmaceuticals from aqueous matrices. Among these, adsorption is one of the most promising technologies due to its simplicity in operation, provided that the adsorbent used is inexpensive. 3-Formyl Rifamycin (3-FRSV) is a drug that belongs to the class of anzamycins, widely used against infections caused by ordinary bacteria, tuberculosis and leprosy. One the other hand, 3-FRSV represent a compound of rifampicin degradation under acidic conditions in solution. Rifampicin's bioavailability is diminished as a result of the varying rates of rifampicin decomposition in the stomach's acidic medium, which ranges from 8.5% to 50% over time and corresponds to a gastric residence time in humans of between 15 and 105 ± 45 minutes for the majority of dosage units. In this study, biocomposite material represented by *Saccharomyces pastorianus* residual biomass/ calcium alginate system was applied for 3-FRSV removal from aqueous solutions. The biocomposite material was synthesized by immobilizing the residual biomass of *Saccharomyces pastorianus* in calcium alginate. Its characterization was achieved by: scanning electron microscopy (SEM), Fourier-transform infrared spectroscopy (FTIR), determination of the beads diameter and a point of zero charge. Lab-scale biosorption experiments were performed in a batch system. Biosorbent beads showed a spherical morphology, diameter of 3,0485 ± 0,01003 mm and point of zero charge 6.7. The effects of the initial 3-FRSV concentration, temperature, time, and biosorbent dose on the biosorption process were examined. Depending on the initial concentration of 3-FRSV solution, the removal efficiency varies as follows: it exceeded 91% for concentrations between 10 and 20 mg/L while for the concentration of 50 mg/L it was 71%, at 21-22°C, at the initial pH value of 2.0 and biosorbent dose of 1.0 g/25 mL. Overall, this study demonstrated that the synthesized biocomposite material has potential for use as a cheap and effective biosorbent for the removal of 3-FRSV from aqueous matrices.

Acknowledgments: This research is a sustainability result of a grant of the Romanian Ministry of Research and Innovation, CCCDI – UEFISCDI, project number PN-III-P2-2.1-PED-2019-1063, within PNCDI III.

Keywords: environmental pollution, 3-Formyl Rifamycin, biocomposite material, *Saccharomyces pastorianus* residual biomass, biosorption.

F.18. OXIDATIVE STABILITY OF DRY WHITE WINES DEPENDING ON TECHNOLOGICAL FACTORS: SULFUR DIOXIDE, IRON AND COPPER IONS

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Abstract. Oxidation processes are slow phenomena that take place throughout the wine's life, from the beginning of winemaking to aging in bottles. Several parameters play an important role in aging of the wine, such as the temperature and hygrometry during the storage of the bottles but also the permeability of the corks which will influence the amount of oxygen brought to the wine. it is accepted that certain grape varieties are especially sensitive to oxidation, suggesting that some of the chemical components key to their sensory attributes are strongly modulated by oxygen exposure. Of all the gases that can be dissolved in wine, oxygen and carbon dioxide can be considered the most important. Oxygen must be considered as a highly reactive chemical agent that has the potential to modify wine by oxidation. The purpose of this paper is to carry out a detailed study of sulfur dioxide (SO_2), copper (Cu^{2+}) and iron (Fe^{3+}) ions distribution and concentrations in wine throughout different stages of the winemaking process. In the dynamics, the physico-chemical indices, specific indices (pH, OD 420 nm, antioxidant capacity, POM-test, other) were performed on the grapes, must and wine samples. Generalizing the results of the experimental and applied presented study, it is revealed that the decomposition rates of oxygen in wines described a good correlation with the total concentration of exogenous copper and iron in the wine samples, both for total and residual concentrations compared to decomposition oxygen rates. The results obtained in this research reveal remarkable new aspects about Cu and Fe speciation in white wine. They open new opportunities for further research on the influence of copper and iron speciation on winemaking.
Acknowledgment: The research was funded in the framework of State Project 20.80009.500727 "Physico-chemical mechanisms of redox processes with electron transfer involved in vital, technological and environmental systems", running at Technical University of Moldova, Department of Oenology and Chemistry.

Keywords: white wine, oxidation, technological conditions.

F.19. STUDIES ON THE USE OF CLAY-BASED MATERIALS IN THE RETENTION PROCESSES OF SOME AROMATIC POLLUTANTS, POSSIBLY USED IN THE MILITARY INDUSTRY

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Abstract. Pollution is a major problem for the entire scientific world. Many laboratories in the country as well as in the whole world are concerned with finding effective and cheap procedures to reduce the existing level of pollution. There are many classic technologies used to retain pollutants, perfectly applicable when pollutants are in high concentrations. But when the pollutants have low concentrations, the classic techniques are no longer effective and it is necessary to discover other methods and processes that are capable of retaining the toxic substances even in very low concentrations. Among the substances that pollute liquid effluents, we were interested in aromatic compounds. These cyclic and polycyclic compounds are substances with variable toxicity, often found as pollutants in the aqueous environment. The aim of this study is to analyze the retention of 4-nitrophenol (p-nitrophenol) from liquid effluents. We have obtained synthetic solutions with very low concentration of the pollutant, and we have studied its retention with commercial clay of the montmorillonite type, known as K10. The pollutant 4-nitrophenol was chosen, because this substance is found in the composition of several pesticide substances. Expanding the scope of interest, aromatic compounds with nitrogen content are also used in the military industry, and can be found in the composition of modern military explosives. The present study proposes an analysis of the retention properties of montmorillonite clays on some such as 4-nitrophenol, expanding later the research on other compounds such as 2,4,6-trinitrotoluene. Thus, 4-nitrophenol solutions of low molar concentrations (between 10^{-7} and 10^{-3} M) were put in contact with K10 montmorillonite, by varying the different parameters (pollutant concentration, temperature, the solid-liquid contact time, dose of adsorbent). The study showed the optimal parameters for the best retention of the pollutant. Also, it demonstrates that montmorillonite is an efficient and a low-cost adsorbent and has very good retention properties of the 4-nitrophenol, which recommends it for use in the retention of some pesticides as well as for military purposes.

Keywords: clay, montmorillonite K10, 4-nitrophenol, retention, military industry.

F.20. THE IMPORTANCE OF BROILERS NUTRITION

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Abstract. Broiler nutrition is very important and is generally based on three phases: the first phase is called the starter phase, the second is the growth phase and the third is called the

finishing phase. Thus, the intake of nutrients must meet all the needs of the chicken in each of the phases. The starter phase corresponds to the first 28 days of the chick, during which it will consume approximately 30-35 g of feed per day, i.e. 1 kg in the start-up period. In practice, this phase is particularly important, as sulfur amino acids (methionine and cystine) must be supplied in sufficient quantity in the ration. A lot of care will be necessary, especially with "starter" chick, where the nutritional requirements and the balance between the different amino acids must be strictly respected. The growth phase corresponds to the period of 28 – 63 days of the chicken on the short chain during which it will consume approximately 75 to 85 g of feed per day, or on the long chain, it will consume an average of 2.9 kg during this period. The finishing phase is the last period, and the duration depends on the age at slaughter. This can vary between 81 and 140 days depending on the reproduction and the circuits and types of marketing. In these stages, the nutritional requirements of chickens vary greatly and differ according to the proposed objectives (age and weight at slaughter), the environment (climate, operating conditions of the course) etc. The intake of sand in food is very important. The sand (clay, gravel and sand) must be introduced from a young age no later than 5 days, with a quantity of 5 to 10 g per chick and per week, so as to promote grinding and thus increase the digestibility of the feed. The importance of the intake of vitamin supplements of a complex A, D, E, are recommended in critical periods (chicken stage, winter, prolonged period of drought, etc.). Contributions of B-group vitamins will be provided by adding brewer's yeast to the feed (2% of the ration). Food for the first feeding period is usually provided in the form of very fine pellets. Feeds for the growing and finishing stages are generally in the form of pellets. All foods must not be very finely granulated in the form of fine flour, because they can stick to the beak, limiting ingestion and growth.

Keywords: chicken nutrition, growth phases, feed.

F.21. STUDY ON THE QUALITY OF CHICKEN MEAT FOR HUMAN CONSUMPTION

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Abstract. The raising of chickens for meat is important, both at the national and international level. Chicken meat provides a necessary for the world population. In most cases, an intensive breeding of chickens is practiced to make production more efficient. Thus, the weight of the chicken before slaughter reaches approximately 2 kg. The amount of feed required to obtain one kg of weight of the chicken before slaughter is approximately 2 kg of feed. The human diet is also represented by the presence of cooked meat on the plate in a proportion of 25%. Currently, the recommendation of nutritionists is to reduce the consumption of saturated fat and increase the consumption of lean meat, especially encouraging the consumption of poultry meat especially in the diet of children and seniors. Chicken meat has a higher nutritional value than the meat of other animals, due to its complete chemical composition and low content of connective tissue. This type of meat has much finer muscle fibers, which makes it tenderer, easier to cook, there is no fat between the muscles of the chicken, the color of the breast meat is white and the leg and wing meat is darker at color. When it is properly associated and to maintain the nutritional value, specific qualitative analyzes are necessary. In order to certify the quality of chicken meat for human consumption, a series of analyses are carried out, such as: moisture content, the identification

of H_2S and the Kreis reaction (for meat freshness), microbiological analyses (*Salmonella*, *Campylobacter*, *Listeria*), radioactivity and various contaminants. The protein and fat content are analysed in order to determine the energy value; meat does not contain carbohydrates. All these analyzes are carried out both by the producers and at the request of the beneficiary. The study highlighted the need for quality certification of chicken meat products.

Keywords: chicken meat, certification, quality control, beneficiary.

F.22. CLASSIFICATION OF EXTRA VIRGIN OLIVE OILS USING CHEMOMETRY ANALYSIS APPLIED TO SPECTROMETRIC DATA

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Abstract. Olive oils are important natural sources of compounds beneficial for the human health and essential components of the Mediterranean diet. Among these oils the virgin extra oils (EVOOs), which are of the best quality, contains triglycerides, mainly containing oleic acid and minoritary compounds such as phytosterols, phenolic compounds, secoiridoids, etc. The chemical composition depends on the geographical origin as well as technological practices. In this study the classification of EVOOs based on the FTIR spectra coupled with chemometrics was carried out. The FTIR spectra were used as "chemical fingerprint" of the EVOOs tacking into account the presence of numerous vibrational bands observed, all these related with the functional groups of the compounds from EVOOs. The data analysis of these spectrometric data, principal components analysis (PCA) and analysis of variance (ANOVA) were shown the discrimination and classification of EVOOs in function of geographical origin (Greece, Spain, Italy, Tunisia) and also in function of the technology used for the extraction of the oil. Therefore, this method could be useful in the characterization and classification of EVOOs, and these are applicable also in the authentication studies.
Acknowledgments: This work was supported by a grant from the Romanian Ministry of Education and Research, CNCS—UEFISCDI, project number PN-III-P4-ID-PCE-2020-0923, within PNCDI III.

Keywords: olive oil, spectrometry, principal components analysis.

F.23. CHEMOMETRIC ANALYSIS OF FTIR SPECTROSCOPIC DATA USED FOR THE DETECTION OF OLIVE OILS ADULTERATION WITH VEGETABLE OILS

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Abstract. Adulteration of olive oils with other vegetable oils is a fraudulent practice due to high value of olive oils. These practices could cause different inconvenient for the consumers not only from economical point of view and also for the reduction of health benefits and increase the risks of allergies. Development of rapid, easy to implement and green techniques for the control of olive oil quality are highly desirable. In this work a method based on FTIR spectra and multivariate data analysis was developed. The authentic olive oil samples were adulterated at the laboratory level with different amount of vegetable oils such as pumpkin

oil, canola oil, grape oil and soy oil (from 1 to 50%). The spectroscopic data of all samples, pure and adulterated olive oils were analyzed by principal component analysis and partial least squares discriminant analysis. The results obtained in the form of scores plots and confusion matrix demonstrated that the olive oils adulteration could be detected at concentration level 0f 1-5% with a very good accuracy.
Acknowledgments: This work was supported by a grant from the Romanian Ministry of Education and Research, CNCS—UEFISCDI, project number PN-III-P4-ID-PCE-2020-0923, within PNCDI III.

Keywords: olive oil, spectrometry, discriminant analysis.

F.24. DETECTION OF OLIVE OILS ADULTERATION WITH ELECTROCHEMICAL SENSORS AND BIOSENSORS BASED ON NANOMATERIALS AND ENZYMES

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Abstract. The extra virgin olive oils have a different chemical composition compared with other oils especially the type of phenolic compounds and their derivatives. For detection of extra virgin olive adulteration with other vegetable oils a novel system based on electrochemical biosensors and multivariate data analysis was developed. The electrochemical biosensors based on carbon nanotubes and graphene modified with tyrosinase or laccase were used for the detection of some representative phenolic compounds from extra virgin olive oils such as tyrosol, hydroxytyrosol, oleuropein and verbascoside. The strategy was by one hand to detect the content of tyrosol, hydroxytirosol, oleuropein and verbascoside in pure and adulterated extra virgin olive oils by cyclic voltammetry. By another hand the cyclic voltammograms were used to develop intelligent models for classification of the oils. The system developed is efficient for the classification of the samples being able to detect the adulteration of extra virgin olive oils at a level of 1%.
Acknowledgments: This work was supported by a grant from the Romanian Ministry of Education and Research, CNCS—UEFISCDI, project number PN-III-P4-ID-PCE-2020-0923, within PNCDI III.

Keywords: virgin olive oil, sensor, biosensor, data analysis.

F.25. MICROWAVE ASSITED OF PEPPERMINT ETHANOLIC EXTRACT

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Abstract. The microwaves assisted extracting (MAE) of bioactive compounds (phenols, flavonoids, chlorophyll) from peppermint with antioxidant capacity analysis was the main goal of the paper. The experiment emphasizes the influence of the microwave field on the quality of the final product in comparison with the classical extraction control samples. The total phenol content (TFlav) after applying the MW treatments significant increased,

compared to the untreated sample. The same behaviour was present in the case of the flavonoid (TPh) and pigment content (CIE L*a*b parameters) in peppermint leaves following the application of microwave treatments. Through microwave processing, a significant increase of antioxidant capacity (DPPH and FRAP) and chlorophyl a, b and total carotenoids are obtained. The multivariate statistical results explain how the biochemical compounds are extracted in the peppermint MAE process. The experimental results prove that by using the energy of the high-frequency field, a better electroporation of the cell membrane of the peppermint sample is obtained, which determines the release of bioactive compounds and assimilatory pigments. Furthermore, in this way, the peppermint extract is a functional product with bio-medical applications.

Keywords: *Mentha piperita L.*, microwave assisted extraction, bioactive compounds, antioxidant capacity, chemometric multivariate analysis.

F.26. FOOD WASTE AMONG ROMANIAN CONSUMERS

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Abstract. The main objective of this study was to carry out an investigation at the national level in order to identify some sources regarding food waste in Romania. In Romania, there are few studies on the role and behavior of actors involved in the fight against food waste. Absolutely every person alone in the household wastes on average 353g of food per day. Most of the time the amount of food thrown away represents a full meal. By comparison, 7% of food waste is produced in retail, while in households, 49%. Another 37% is lost in the food industry, 5% in public food and only 2% in the agricultural sector. Approximately one third of all products in Romania end up in the trash or are unnecessarily wasted annually. This amount corresponds to approximately 2.55 million tons of food products, which corresponds to the load of 127,500 trucks lined up in a column from Bucharest to Munchen. Romania ranks 9th in the EU ranking regarding food waste: 6,000 tons of good food are thrown away every day, 2.2 million tons of food end up in the trash every year. Wasted food means wasted money, and this happens in the context where approximately 50% of Romanians spend approximately 40% of their monthly income on food. Moreover, there is another face of Romania: a country where over 46% of children from villages under the age of 6 live at risk of poverty and malnutrition, 60% of rural families cannot secure their daily food and approximately 5 million Romanians live at risk of poverty. In the context of the crisis generated by the COVID-19 pandemic, it is expected that their number will increase substantially, further deepening the paradox of hunger in times of plenty. The need to continue the awareness and education campaigns initiated at the government and civil society level and the clustering approach that allows the creation of different segments of Romanian consumers based on their perceptions, attitudes and beliefs regarding food waste is indicated.

Keywords: consumers, food, waste, education, Romania.

F.27. CHROMATIC AND IMAGISTIC ANALYSIS OF BREAD WITH ADDITION OF BUCKWHEAT FLOUR

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Abstract. Bread is one of the most important staple foods consumed by mankind throughout time. Since it is a staple food for many peoples and population categories, bread is often fortified to improve nutritional properties. Bread fortification is done by adding rye, rice, barley, oat, corn, buckwheat, millet flours, by adding potatoes or seeds, but also fruit powder, etc. The color of food is the first quality parameter evaluated by consumers and is essential in the acceptance of the product. Food color is considered the most important factor for flavor perception; it sets consumers' expectations about what those food products will taste like, as well as the pleasure or distaste of experiencing those products. In the present paper the chromatic and imagistic analysis was performed over bread without added buckwheat flour (BWF) and bread and with added buckwheat flour (BBWF) scanned image samples with six different extract concentrations (2.5; 5; 7.5; 10 and 12.5 % BWF). The investigated chromatic parameters were CIE L*a*b* and browning index (Bi). The imagistic analysis performed pixel classification with fifteen classes (C1 ÷ C15) based on chromatic criteria. Due to bread particular porosity property, the a* and b* chromatic criteria for all nine classes were the same; the L* chromatic criteria decreases from 100 to 0 in nine steps from C1 to C15. The scanned image pixels that define the bread samples were classified according the proposed fifteen chromatic classes and the imagistic results were expressed as percentage pixel content. The Pearson coefficient was used to investigate the physical-chemical and chromatic parameters. The results prescribe strong positive and negative correlations. First exception is between Moisture and Elasticity parameters, that has correlation value of an average positive correlation. The a* chromatic parameter has a quasi-uniform distribution and it performs weak correlation with the other analysed parameters. The imagistic classes distributions were regressed with Lorentzian function. The regressed data was subjected to paired sample Friedman's test (P = 0.05) and post-hoc pairwise Nemenyi's test (P = 0.05). There were reported sample grouping between: samples with 2.5% and 5% BWF and samples with 7.5%, 10% and 12.5% BWF; the control sample is a singleton group. Multivariate analysis sequence (Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA) and multivariate Analysis of similitude (ANOSIM, P = 0.05)) was done in order to assess the samples clusters. The results of the multivariate analysis prescribe a full discrimination between all the BBWF samples (i.e., each analysed sample consist in a singleton cluster), with exception of control and 2.5% samples that gather in a cluster.

Keywords: buckwheat flour, bread formulation, colour image analysis, porosity of bread.

F.28. PREPARATION OF AN ADSORBENT MATERIAL FROM CHERRY STONES POWDER AND ITS APPLICATION IN RETAINING AZO DYES FROM AQUEOUS SOLUTIONS

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Abstract. As a result of industrial activities, wastewater containing toxic or difficult to destroy compounds, is one of the primary causes of water contamination. This increasing environmental concern concentrates efforts in establishing and implementing various ways of water depollution. The present work was aimed to firstly prepare a new material with valuable properties. Cherry stones powder (an undervalued by-product from fruit processing industry) was entrapped in an inert polymeric matrix. The obtained product served to retain a model azo dye molecule from its aqueous solution. Three parameters with high impact on process development, namely the initial pH of dye solution, the adsorbent quantity and the working temperature, were optimized by Response Surface Methodology. The adsorption process is well described by pseudo-second-order kinetics and it follows Freundlich and Temkin equilibrium isotherms. The recorded results revealed that the refractory pollutant was removed almost completely from the media allowing us to conclude that the prepared material can be considered a viable adsorbent material.

Keywords: adsorption, cherry stones, equilibrium isotherm, kinetic studies, Response Surface Methodology.

F.29. FATTY ACID METHYL ESTER (FAME) PROFILES OF FISH RESIDUAL MATERIALS USED AS HORTICULTURAL AMENDMENTS

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Abstract. There is an obvious propensity currently towards the valorization of residual materials from the aquaculture and fishing sector, e.g., those resulting from the capture of wild fish, from fish farming, from the algae and seafood industry. Fish residual materials can be used as fertilizers, either as such or composted with various plant wastes, e.g., sawdust, straw. Different marine residues obtained by processing fish for consumption, i.e., backbone powder, ground head bones and backbones, acidified ground backbones, were provided by Norwegian Centre for Organic Agriculture, (NORSØK, Norway). Fatty acids from fish residues were extracted with n-hexane (at 85 ± 3 °C for 30 min), derivatized (with potassium methoxide) into fatty acid methyl esters (FAMEs), then the FAMEs were injected into the GC-MS system (Agilent 7890B GC & 5977A Series GC/MSD), using a 100 m Select FAME GC capillary column. All fish residues had high concentrations of the following FAMEs: C16:0 (14.7-32.1%), C18:1n9c (15.7-29.9%), and C22:6 (7.7-19.7%).
Funding: This work is part of the project 244/2021 ERANET-BLUEBIO-MARIGREEN, which has received funding from the European Union's Horizon 2020 research and

innovation program under agreement 817992 and Ministry of Research, Innovation and Digitization, CNCS/CCCDI – UEFISCDI, within PNCDI III.

Keywords: fish backbones, fish head bones, FAME, marine residues.

F.30. VALORISATION OF CHOKEBERRY POMACE BY-PRODUCT AS A FUNCTIONAL INGREDIENT IN MUFFINS FORMULATION

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Abstract. Black chokeberry (*Aronia Melanocarpa*) is a distinctive berry with a high content of polyphenols, particularly anthocyanins and proanthocyanidins and have the highest antioxidant activity among many fruits. After pressing process of chokeberry fruits result juice and the pomace as by-product. Chokeberry pomace is a good source of bioactive constituents that might be used for various applications, particularly functional food ingredients. This by-product can be valorised in different ways such as animal feed, cosmetic products, new food products, bioactive compounds extracts, health beneficial supplements etc. Application of chokeberry pomace as a supplement to animal feed or human food requires an examination of cyanogenic compounds content, represented by amygdalin. These compounds are present in plants in the form of glycosides, most of all and are perceived as potentially harmful because as a result of their decomposition, poisonous hydrogen cyanide is created. Cyanogenic glycosides are often present in seeds whereby they participate in the process of sprouting. Bakery products such as cakes are widely consumed all over the world. Enriching bakery products with functional nutrients is a need for people's health. The aim of this study consist in valorisation of chokeberry pomace by-product as a functional ingredient in muffins formulation in order to increasing the nutritive value of bakery product. Chokeberry pomace powder was used in different amounts in order to formulate the muffins with improved sensory and physico-chemical characteristics and with high nutritive value.

Keywords: chokeberry pomace powder, valorisation, formulations, muffins.

F.31. THE USE OF NANOMATERIALS IN ROSEHIP OIL TREATMENT

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Abstract. The application of nanomaterials in the food industry is beneficial from the point of view of food safety, increases food quality, decreases time for pathogen detection and financial costs. Nanotechnology has the potential to change the product from manufacturing to storage, processing, packaging, transportation. Research shows that almost all the substances our body needs are found in a poppies fruit. Vegetable oils offer excellent biological properties, but their high lipophilicity limits their bioavailability. The main objective of the present study was to carry out an investigation on the treatment of rosehip oil with the help of nanomaterials. The ability of Nanostructured Lipidic Transporters to co-encapsulate an extract rich in carotenoids together with a drug with anti-acne action (azelaic acid - AzA), conditioned in the form of a hydrogel, was investigated for the first time on rose hip oil. Their potential to release the two active substances (hydrophilic and lipophilic), the

antioxidant action in vitro, as well as the anti-inflammatory action, in vitro and in vivo, were included in this chapter. In order to highlight the advantages of hydrogels containing Nanostructured Lipidic Transporters, their anti-inflammatory action in vivo was determined in comparison with a commercial product. The hydrogel based on Nanostructured Lipidic Transporters showed an anti-inflammatory action superior compared to the commercial hydrogel.

Keywords: nanomaterials, rosehip oil, treatment.

F.32. EFFECT OF ROSE HIP ON GINGERBREAD QUALITY AND STABILITY

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Abstract. The development of new generation foods to provide consumers with dietary fiber, antioxidants, vitamins is particular interest. The aim of the scientific research was to develop the manufacturing technology of glazed sweet gingerbreads with the use of rosehip fruit (*Rosa canina L.*) powder additions to diversify the range of functional products. The addition of vegetable powder was used in concentrations of 2 and 4% compared to the mass of the flour, and for glazing, the syrup fortified with rosehip extract was used in an amount of 2% compared to the mass of the syrup. The total content of polyphenols, flavonoids, cinnamic acids, flavonols, carotenoids and antioxidant activity were analyzed in the rose hip extract. The content of individual polyphenols and carotenoids was identified. The results demonstrated a high content of polyphenols, carotenoids and antioxidant activity. The main phenolic components are procyanidin B1, chlorogenic acid, epicatechin, procyanidin B2, gallic acid, salicylic acid and catechin. The carotenoid complex includes all-trans-carotene, all-trans-lycopene, zeaxanthin, α-cryptoxanthin, β-cryptoxanthin, rubixanthin, cis-β-carotene, cis-γ-carotene and cis-lycopene. The addition of rosehip powder to gingerbread has improved the overall characteristics, increased its antioxidant activity and microbiological stability.
Acknowledgments: The authors would like to thank the Moldova State Project no. 20.80009.5107.09 "Improvement of food quality and safety by biotechnology and food engineering", running at Technical University of Moldova.

Keywords: rosehip fruit, gingerbread, biologically active compounds, antioxidant activity, quality.

F.33. AN INVESTIGATION INTO SYNTHESIS OF MIXED OXIDES AND THEIR USE ON WATER DECONTAMINATION

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Abstract. Classical wastewater treatments have often an unsatisfactory effectiveness in removing refractory pollutants such as pharmaceutical compounds. This major drawback can

be counterbalanced by developing new and eco-friendly technologies for water purification. Implying advanced oxidation processes, photocatalysis is one of these technologies. It is based on the use of a semiconductor material for generating highly reactive species, such as hydroxyl radicals, under UV light irradiation. The reactions occurring between OH● group and the contaminants are responsible for their degradation or transformation in inoffensive byproducts. The present study was directed to the synthesis of zinc and lanthanum mixed oxides through coprecipitation in alkaline medium. A solution of metal precursor was prepared by dissolving zinc nitrate and lanthanum acetate to obtain a 0.5 mol/L metals concentration. The obtained mixture was then added dropwise in a beaker, under magnetic stirring, at a flow rate of 10 mL/min. The pH was maintained at 10 by slowly adding NaOH solution (1M). The resulted combination was stirred for 30 min, heated at 100°C and then vigorously stirred (750 rpm) for 24h. The mixture was cooled at room temperature and centrifuged for 10 min at 4000 rpm, washed with distilled water and oven-dried at 60 °C. The product was split in half and calcined at 400°C for 4h. BET, SEM, UV-DR and IR spectroscopy were used to characterize the obtained samples. In order to examine their photocatalytic activity, they were put in contact with aqueous solutions of clofibric acid (CA), a common pharmaceutical product used as a blood lipid regulator. CA residual concentration was established by HPLC analysis and its mineralization was evaluated by TOC measurements. Preliminary tests reveal that both calcinated and uncalcinated samples are able to degrade the clofibric acid with yields of 97 % and of 80 % respectively. After 60 min of irradiation in the presence of the calcinated product, the CA existing in a solution with initial pollutant concentration of 3 mg/L is completely removed. For an initial concentration of 50 mg/L, over 80 % degradation is achieved after 180 min of reaction. Moreover, the experiments show that the sample can be reused. A loss of activity of only 6 % was observed after three cycles of photocatalytic tests. The synthesized photocatalyst can be therefore considered for further investigations in view of possible industrial applications.

Keywords: clofibric acid, mixed oxides synthesis, photocatalysis, UV-A irradiation, water treatment.

F.34. AMMONIA ADSORPTION ON PILLARED CLAY IN MAGNETIC FIELD. MATHEMATICAL MODELLING AND OPTIMIZATION BY RESPONSE SURFACE METHODOLOGY

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Abstract. Reduction of ammonia emissions before discharge into the atmosphere can be achieved by adsorption processes. An adsorbent based on aluminum pillared clay mixed with steel particles was prepared and then characterized by Energy Dispersive X-ray analysis associated with SEM, thermo-gravimetric analyses with TG and DTA curves determination, BET method for pore structures and surface area determination and X-Ray Diffraction for basal spacing determination. The coaxial magnetic field served for adsorption process intensification and to improve the dynamic conditions. The ammonia retention was determined by gas-chromatography. In this study, a Response Surface Methodology - Central Composite Design was employed for mathematical modelling and optimization of mass fraction of steel, fluidization degree and magnetic field intensity. Adsorption capacity of ammonia gas on aluminum pillared clay particles was set as response function. The developed mathematical model established that for a mass fraction of steel of 0.691, a fluidization degree of 0.13 and a magnetic field intensity of 12840.722, the adsorption capacity is of 0.884 mmol/g.

Keywords: adsorption capacity, aluminum pillared clay, ammonia, magnetic field, Response Surface Methodology.

F.35. APPLICATION OF ULTRASOUND TREATMENT TO IMPROVE SENSORY CHARACTERISTICS IN RED WINES

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Abstract. Ultrasounds (US) are sound waves at frequencies over 20 kHz that have been used recently as non-thermal "green" technology for winemaking according to International Wine Organization (OIV). Ultrasound technology has a cavitation effect, causing bubbles to form and collapse rapidly as they travel through the medium. As ultrasound breaks the cell wall mechanically by the cavitation shear forces, it accelerates the transfer from the cell, the extraction of skin anthocyanins, phenols and aroma compounds into the must and wine. Also, the process of fermentation and maturation of red wine are influenced. Therefore, the physico-chemical characteristics and the organoleptic properties are improved such as flavor of wine bouquet of wine, color and taste. Several studies have demonstrated that the application of ultrasounds increases color and aroma and implicit sensory properties of red wine by improving the extraction of tannins aromatic and phenolic compounds from grape seeds and skin. The objective of this study is to evaluate the sensory characteristics of two varieties of wines obtained from red grapes from *Vitis vinifera* L. cv. *Carbernet Sauvignon* (CS) – Jariștea vineyard and *Muscat Hamburg* (MH) – Țifești vineyard (Vrancea, Romania). The grapes were processed in the laboratory first time by conventional procedures of red winemaking from 2019 vintage grapes. At the same time, other similar samples were subjected to ultrasound treatment for 10 and 30 minutes respectively, in order to speed up extraction of polyphenolic compounds, flavors and colorants. The untreated and treated samples were subjected to the alcoholic fermentation process. After their general physico-chemical parameters (sugar content, alcohol content, total acidity, density, pH, conductivity, redox potential, dissolved oxygen, turbidity) were evaluated, the sensory characteristics were tested. The wines for tasting have been temporarily stored in conditions that preserve their intrinsic properties. It was used a sensory analysis by scoring method with 20 points scale. The results showed that the clarity, color and aroma obtained a higher score to the sonicated samples compared to untreated samples on both varieties of wine. Regarding the taste, the CS sonication samples were preferred by 26.5% compared to the untreated sample, the taste being preferred by 31% to the untreated MH sample. The US treatment improved the clarity, color, taste and global quality of CS wines, but in the case of the MH variety, a higher score for taste was obtained for the wine not treated with US. The results of the sensory analyzes were correlated with the physico-chemical parameters for all the wines. Generally, the sensory attributes of the wines obtained by ultrasound treatment were better in CS wines but less good in MH wines against without US treatment.

Keywords: extraction, polyphenols, red wine, sensory characteristics, ultrasound.

G. INDUSTRIAL POWER ENGINEERING & COMPUTER SCIENCE

G.1. STUDY OF SECURITY BREACHES DUE TO ON GPU EXECUTION

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Abstract. Malware code is hidden by new methods so that it cannot be detected by antivirus programs. Obfuscation and real-time polymorphism are two significant challenges along with the computing power of GPUs and CPUs, which are increasingly powerful together. New gadgets include specialized GPU cores that act as video processing accelerators, they may have other additional activities, such as taking over tasks from the CPU or running tasks in parallel. GPUs will grow in popularity and computing power, making them attractive to attackers, who will look for vulnerabilities in their hardware or software to use to compromise the system. It also attempts to demonstrate how a malicious program can abuse the GPU processor by intercepting and scanning any suspicious activities of programs executed by the operating system (OS) through the CPU, which attempt to use access to the GPU, by checking the code in GPU memory and analyzing the code executed by the GPU. It is also shown that by using existing graphics hardware, graphics processing units, memory and computing power of GPU processors, these features are used by malware to make attacks more powerful and at the same time more robust against detection.

Keywords: OpenCL, SPIR-V I, Threat Detection, Graphic processing units, Memory analysis, MalwareDigital Forensics, GPU Malware.

G.2. PERFORMANCE COMPUTING BASED ON NATURE-INSPIRED MODELS

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Abstract. In the last three decades, special attention has been given to the application of nature-inspired models, particularly in areas such as planning and organizing performance computing processes. There have been already achieved the theoretical and applicative scientific results that attest performance and efficiency of such systems. Particular attention is paid to the development of computational models for decision-making problems based on multi-objective optimization. As examples of nature-inspired computing models can be mentioned: cellular automata, neural computation, evolutionary computation, swarm intelligence, artificial immune systems, membrane computing, etc. Membrane computing represents a particular case of nature-inspired computational models, based on the use of paradigms, mechanisms and working principles of biological cells (living cells), such as: the structure of the cell, the mode of interaction between cells and their physiological properties. These models provide an efficient formal description of hierarchical, parallel/concurrent and synchronous/asynchronous computing processes oriented to the

data flow processing. The objectives of the research presented in this paper are the development of a methodology for implementing membrane computing models in reconfigurable hardware architectures oriented towards processing data flow that can be applied in multi-objective decision-making systems.

Keywords: Nature-inspired models, Membrane computing, Decision-making systems, Multi-objective optimization, FPGA architecture.

G.3. ON THE STRUCTURAL AND OPTICAL CHARACTERISTICS OF POLYCRYSTALLINE ZNO THIN FILMS

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Abstract. The transparent conductive oxides are some of the most investigated materials due to their important applications in modern technology of solid state devices. Zinc oxide (ZnO) belong to this semiconducting class of compounds. Among the other oxides in thin films, zinc oxide (ZnO) thin films are very important due to their application as an active semiconductor compound in transparent electronic devices. ZnO thin films are used as transparent conducting electrodes and buffer layers in solar cell technology, as a material in sensor technology, ultrasonic oscillators and transducers, optical waveguides and other important applications. ZnO properties are determined mainly by the non-stoichiometry of the films resulting from the presence of oxygen vacancies and interstitial zinc atoms. A few methods are preferred to obtain ZnO thin films: chemical vapor deposition, electro-deposition, the sol-gel technique, metal-organic chemical vapor deposition, spray pyrolysis, r.f. magnetron sputtering, pulsed laser deposition etc. In this paper, ZnO thin films were prepared by thermal oxidation of vacuum evaporated zinc films. Structural, optical and electrical properties of as obtained ZnO films were investigated.

Keywords: thin films, optical properties, structural properties.

G.4. OPTIMIZING THE OPERATING REGIME OF THE TRANSFORMERS IN A ELECTRICAL DISTRIBUTION SUBSTATION

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Abstract. Power transformers are devices without moving parts that changes electrical parameters of energy received. In a distribution substation there are, commonly, two or more interconnection transformers. The characteristic part of establishing the optimal balance of a substation is the determination of the transformers that must operate and those that must be disconnected in various ranges of total apparent power required by the substation, so as to achieve minimum losses of power and active energy, but not only in the actual station considered, but on the whole formed by this station and the networks that feed it, regardless of the fact that they belong to the owner of the station or the energy system. For this purpose, load loss curves must be determined for all possible combinations of transformers and the number of transformers to cover the required load. Such a solution

is proposed in this paper. A distribution substation with two interconnection transformers is analyzed. The relations for calculating: - active and reactive power losses on the set of n transformers operating in parallel are established; - losses of active power on the entire station in n transformers operating in parallel and in the power supply networks of the station – which are the losses that must be minimized. Based on drawing the loss curves for all possible combinations of the number of transformers and of transformers connected working in parallel, it is seen, for the various load ranges, which are the combinations that give minimum losses and the respective operating regime is adopted. For that regime, the energy losses are calculated as in the real balance. For the analyzed electrical distribution substation, a loss reduction of 537 MWh/year was obtained by optimizing the operating regime of the transformers.

Keywords: power transformer, substation, optimization.

G.5. OPTIMIZATION OF ELECTRICAL SUBSTATION DIAGRAMS ON RELIABILITY CRITERIA

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Abstract. Establishing the single-wire diagrams of the substations together with the re-engineering operation is an essential element, it being influenced by a series of factors, such as: - operational safety of the electricity transmission system in Romania; - minimizing the number of network faults, corrective maintenance operations and planned maintenance operations. As a relevant indicator for the operational safety of the transformation substation, the average annual probable duration of non-operation (total or partial) of the facilities in the substation was taken. It should be noted that the value of this indicator depends on the success status imposed on the substation. Normally the success status is given by the realization of all the functions imposed on the design of the substation. However, variants can also be analyzed in which only critical functions are required, such as ensuring the transit of electricity to consumer nodes or the transit of electricity between two important areas of the energy system. The paper presents an example for a 400/110 kV station. 4 variants of connection diagrams at the 400 kV substation were analyzed: polygonal diagram unsectioned single bar double bar (without transfer bar) diagrams with 1.5 circuit breakers.

Keywords: substation, optimization, reliability.

G.6. RECOGNIZE STATIC GESTURES USING HIDDEN MARKOV MODEL

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Abstract. HMM efficiently models spatio-temporal information, using mathematical structures (Baum-Welch and Vitrerbi algorithms) for evaluation, learning and decoding. In the current paper will present the accuracy that this method had proven through a series of experiments. Gesture recognition refers to the recognition of specific human expressions and/or features (arms, hands, face, head and whole body) captured by a webcam. These are

very important for an efficient human-computer interface. Image segmentation, feature vector extraction, HMM model training are the main methods used for the recognition process. The applications of gesture recognition range from sign language identification, forensic identification procedures and techniques; procedures for identifying lies navigation through virtual environments, sign language recognition, robot control to patient health monitoring.

Keywords: static, HMM, hidden layer, models, information.

G.7. THE CURRENT STATE OF RESEARCH ON COMPLEX TEXT AND DOCUMENT ANALYSIS ALGORITHMS

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Abstract. Complex text and document analysis algorithms are a rapidly developing field of research within the realm of artificial intelligence and natural language processing (NLP). These algorithms are designed to interpret and extract relevant information from complex texts and documents, including academic papers, legal documents, and technical reports. Recent advances in deep learning and NLP have led to the development of more sophisticated algorithms that are capable of processing large and complex data sets, including those that contain multiple languages and are written in diverse formats. Some key areas of focus for research in this field include named entity recognition, topic modeling, summarization, and document classification. Despite the progress that has been made in this field, there are still many challenges to overcome. For example, the accuracy of these algorithms can be affected by biases in the data used to train them, as well as by issues related to data privacy and security. Researchers are also working to develop more effective evaluation metrics and to address issues related to the explainability and interpretability of these algorithms. In conclusion, the current state of research on complex text and document analysis algorithms is a dynamic and rapidly evolving field with many opportunities for innovation and improvement. Ongoing research in this area is likely to lead to the development of more sophisticated algorithms that can better understand and analyze complex texts and documents, with applications in a wide range of industries, including healthcare, finance, and government.

Keywords: artificial intelligence, natural language processing (NLP), algorithms, text.

G.8. THE CURRENT STATE OF RESEARCH ON RECOGNITION AND EVALUATION OF HUMAN ACTIVITY BY PROCESSING VIDEO STREAMS

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Abstract. Although we are only at the beginning of 2023, several new technologies and methods for recognizing human activity in video streams have already been developed, showing significant progress in this direction. These include deep learning-based methods that use convolutional neural networks and machine learning models to identify and classify human activity in real time. One of the newest technologies is high-performance convolutional neural networks, which use advanced network architectures and machine learning algorithms to accurately detect and classify human activity. These networks are trained on large video datasets and are able to recognize complex human activities such as

walking, running, dancing or other physical activities. In addition, methods based on motion analysis and object recognition continue to be developed and improved with the use of machine learning algorithms and advanced image processing technologies. These methods are capable of identifying and tracking object motion and human activity in video streams, and can be used in a variety of applications such as public safety, environmental monitoring and machine learning. In conclusion, the development of new technologies and methods for recognizing human activity in video streams continues to be an important issue in computer vision, and recent advances in deep learning and image processing algorithms promise to bring significant improvements in this area.

Keywords: artificial intelligence, convolutional neural networks, video streams, deep learning.

G.9. VIRTUAL AND AUGMENTED REALITY GUIDE FOR MUSEUMS

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Abstract. This work aims to present solutions for the creation and implementation of guides based on augmented reality that make them attractive, captivating and offer interactive experiences to museum visitors. Augmented reality it's new technology that has great potential for use in museums. The guide will also help visitors to navigate the museum, providing them with information about the exhibits and artefacts they are viewing. Design: The design of the AR guide for museums will involve several key components, including: mobile application, map and navigation, Information about exhibits, interactive experiences and social features. All these elements are related to each individual implementation case. The guide will be available as a mobile application that visitors can download on their smartphones or tablets. The application will use AR technology to provide visitors with a unique and interactive experience. The guide will include a map of the museum, with markers indicating the location of exhibits and artefacts. When visitors approach an exhibit, the AR guide will provide them with information about the exhibit, including its history, significance, and context. Visitors can use this information to gain a deeper understanding of the exhibit and its relevance to the museum's collection. The AR guide will provide visitors with interactive experiences that enhance their understanding of the exhibits. Applications that can be used in the implementation of guided tours using augmented reality are also presented, such as: Khora Exposure, ARLOOPA, REBLINK, PAMM AR.

Keywords: Augmented reality, guide for museums, interactive experiences, mobile application.

G.10. COMPARATIVE ANALYSIS OF PREDICTIVE MAINTENANCE SYSTEMS FROM SPECIALTY LITERATURE

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Abstract. In the context of 4.0 industry standard, predictive maintenance (PdM) is the maintenance strategy desired by most manufacturing plants. In the PdM strategy, service activities take place only when they are needed. By applying a PdM strategy, equipment uptime is increased and maintenance costs are considerably reduced. To keep assets running, PdM uses sensors to monitor the health of the equipment and schedule maintenance activities only when they are needed. Although the paradigm of PdM is not new, the concept being defined in the late 1940s, the emergence of emerging technologies such as Cyber-Physical Systems (CPS), Internet of Things (IoT), Big Data (BD), Machine Learning (ML) and Internet of Services (IoS) have enabled the seamless application of PdM in modern industries. Starting with the works in the specialized literature, the authors present the component elements of the PdM systems. In this work, a comparative analysis of the main PdM systems in specialized works is also presented.

Keywords: predictive maintenance, internet of things, machine learning.

G.11. PREDICTIVE MAINTENANCE SYSTEM FOR A PARK OF ELECTRIC SCOOTER

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Abstract. In recent years, electric scooters have started to be used more and more due to the advantages they bring. Electric scooters allow users to be transported at a minimal cost. Over the years, a number of companies that offer electric scooter rental services in urban areas has appeared. Operation with minimal maintenance cost requires the application of predictive maintenance (PdM) policies. In this paper, the authors present the architecture that a PdM should have for a fleet of electric scooters. The presented PdM system allows estimating the Remaining Useful Life (RUL) of the Li-ion batteries as well as identifying the defects of the Brushless DC Electric (BLDC) motors in the electric scooters. To implement this PdM system, it is necessary to monitor with the help of sensors the parameters that give us information about the state of health of the Li-ion batteries as well as the BLDC motors in the electric scooters. The data obtained from the monitoring of each electric scooter is transmitted via GSM or LoRa communication to a server, to be analyzed using Machine learning algorithms. Following the analysis, it will result for each electric scooter, the RUL of the Li-ion battery and also if the motor works with one of the analyzed types of detection.

Keywords: predictive maintenance, electric scooters, machine learning.

G.12. STUDY ON PARTIAL SHADING IRRADIANCE CONDITIONS OF PHOTOVOLTAIC ARRAYS

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Abstract. Solar photovoltaic (PV) generation suffers from multiple serious issues, for example islanding and shading effects directly affect the performance of installed PV arrays under risk and limited. By studying those issues, it can play a role in improving the performances of PV panels by knowing their limitations and improving them. The study of PV arrays under partial shading conditions is mentioned in a lot of papers as a part of other studies and as an independent phenomenon. Therefore, it is very necessary to improve these studies and update them with new research and study this problem in detail to know how to limit the effects of partial shading irradiance conditions on PV arrays performances. This paper proposes to study the effects of the partial shading irradiance conditions for a PV array in various configurations under different partial shading conditions. The analysis is proved in detail through the simulation of the proposed PV array in the Matlab/Simulink environment. The obtained simulation results show the performances of interconnected PV arrays under different partial shading irradiance and temperature conditions, including the solar array I - V and P - V characteristics. In addition, different PV array configurations with and without bypass and blocking protection diodes improve and minimize the effect of partial shading conditions and avoid the reductions in output power.

Keywords: photovoltaic (PV) arrays, solar power generation, partial shading, bypass diodes, simulation.

G.13. ANALYZING INTELLIGENT PATTERN RECOGNITION SYSTEMS TO SPECIFY THE TIME OF OCCURRENCE AND TYPE OF FAULT IN GAS-INSULATED CIRCUIT BREAKERS

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Abstract. Although GIS (Gas Insulated Switchgear) are declared as "maintenance-free", various defects can still occur that lead to their premature failure. In this article I analyzed the research carried out in the field of pattern recognition that could help to determine an analytical model that would estimate the moment of appearance of the defect, as well as its type.

Keywords: GIS, pattern recognition, neural network, learning machine.

G.14. COMPARATIVE STUDY OF A BUCK DC-DC CONVERTER CONTROLLED WITH THE PI OR FUZZY LOGIC REGULATORS

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Abstract. This paper presents a comparative study of a voltage step-down converter controlled with the PI regulator and with the fuzzy logic regulator fed from a photovoltaic system. This study aims to increase the amount of electrical energy taken from the photovoltaic system by the load through the DC-DC converter. To determine the maximum power point that is transferred from the photovoltaic system to the load, the disturb and observe method was used. In the MATLAB Simulink program, two programs were developed for the implementation and simulation of the MPPT perturb and observe algorithm with the PI controller and the fuzzy logic controller. The photovoltaic system consists of two photovoltaic panels connected in parallel and has a power of 360 W. The buck DC/DC converter will lower the voltage from the value of 36.5 V to the value of 24 V.d.c. and will successively feed a resistive load with a value of 12 Ohms or will charge a battery consisting of two 12 V batteries connected in series. After analyzing the results of the simulations made in MATLAB Simulink, it was found that better results are obtained in the case of using the MPPT perturb and observe algorithm with the fuzzy logic regulator.

Keywords: buck DC-DC converter, photovoltaic system, fuzzy logic regulator.

G.15. THE DETERMINISTIC NOISE OF THE ELECTROMYOGRAPHIC SIGNAL PREPROCESSING FOR THE CREATION OF OPTIMIZED MODELS IN THE REHABILITATION AND REEDUCATION OF WRIST/HAND ACTIVITY

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Abstract. In this field, rehabilitation and reeducation of hand activities, around of gross and fine mobility, the electromyography (EMG) signal shows an important assignment in interpreting the intentions and physical conditions of patients. Using only the electromyographic signals fall off difficulties in recognizing the slight movements of body segments, and the detection precision is strongly influenced by environmental factors. The electromyographic pattern recognition techniques based on multisensory integration have been developed in recent years and valuable results have been demonstrated in various rehabilitation scenarios, such as achieving high locomotion detection and prosthesis control. In line to the importance and rapid development of EMG-centric multisensory fusion technologies in rehabilitation, this paper reviews the theories and the applications in this domain: the principles of electromyographic signal generation and the renewed process of pattern recognition, counting signal preprocessing, feature extraction, algorithms for classification, established on which optimized models of wrist/hand rehabilitation and re-education can be capable to be analyzed and determined. The interference processes of the two mainly sensory multisignals fusion strategies, kinetic and kinematic respectively, are involved in this standpoint. In this perspective, the evidence of the electromyographic signals that can be saved by remote techniques and properly treated; are studied through the appropriate applications - especially the pro and con arguments involved in the development of the final model proposed by this scientific approach. In conclusion, the

major challenges in EMG-centered sensorial multisignals configuration recognition and a future research approach of this field are prospected. The collaborative mechanisms between two important sensorial multisignals combination strategies (kinetic and kinematic respectively) and the electromyographic specifics are studied in specify; the conforming applications are investigated and the arguments in the election (pros and/or cons) and the construction of optimized models are researched. Finally, as practical conclusions, the major challenges in the recognition of patient-centered sensory multisignal patterns are presented and a potential research direction are prospected -research and diagnostic stands, with a high degree of customization on the updated needs of the patient, based on optimized models.

Keywords: rehabilitation and reeducation, electromyography, multisensory signal, optimized models.

G.16. COMPARATIVE STUDY BETWEEN LOW-COST PLC AND A RASPBERRY PI 4 WITH OPENPLC

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Abstract. This paper presents the technical and economic differences between a Raspberry PI 4 and a PLC at a comparable price. The advantages would be towards PLC is designed specifically for industrial control applications and is built to withstand harsh environments. However, a Raspberry Pi with openPLC may have better connectivity options and can be easily integrated with other devices. Relative to cost a Raspberry Pi 4 with 8 GB RAM and openPLC can be less expensive than a PLC with similar capabilities. This is because the Raspberry Pi is a widely used computer that is mass-produced, and the openPLC software is open source and freely available. Regarding maintenance, a Raspberry Pi 4 with 8 GB RAM and openPLC may require more frequent maintenance and upgrades compared to a PLC. PLCs are usually designed to be very reliable and require minimal maintenance. They also have a longer lifespan and are built to withstand harsh environments. The advantages of PLCs are also at the level of support, scalability and Interoperability. In general, the execution time of a PLC instruction in a Raspberry Pi with openPLC is usually faster than a traditional PLC due to the more powerful processor and larger memory capacity. However, the specific execution time can only be determined by measuring the performance of the specific logic and hardware configuration used. Raspberry Pi 4 due to the hardware configuration ensures faster processing and more memory compared to a traditional PLC. This paper also presents technical and economic differences between a Raspberry Pi 4 with 8 GB RAM running openPLC and the Modicon M221 and EASY719-AB-RCX EATON PLCs. EASY719-AB-RCX and Modicon M221 may be a better choice for applications that require dedicated hardware designed for industrial environments and have specific I/O requirements.

Keywords: openPLC, raspberry Pi, PLC, advantages.

G.17. FROM REAL-TIME EMULATION OF WIND AND TIDAL TURBINES TO SIMULATION OF DISTRIBUTED GENERATORS INTEGRATED INTO THE POWER GRID - WORK REPORT AND PROJECTS

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Abstract. This work reviews independently written is based on PhDs and masters personal supervisory on Power Management and on Efficiency Energy Improvement in Hybrid Renewable Energy Systems.

The first part of this report concerns the implementation stages of a multi physics simulation system for the study of wind-tidal energies systems and their electrical hybridization and electromechanical coupling. The concept of hybridization of horizontal axis wind and tidal turbines are based on their functional similarities, the principle of the emulator system including the development of two subsystems, an electromechanical subsystem and the other one for control and supervision. The second part of the report is dedicated to Power flow analysis for optimized location and size of Distributed Generators (DGs) like Wind/Tidal/PV systems. We also developed simulation methodologies for electric grids monitoring requiring less computation time. We describe various stages of our work regarding the capability of the classical network to support diverse levels penetration of DGs focusing on wind/tidal/PV energy system. Finally, we propose a virtual Renewable Energy Platform for Online Scientific Exchange (REPOSE). The Expected Outcomes are the sharing common interests in Renewable Energies (operating conditions, optimum energy efficiency, power availability, financial aspects) and cooperative exploring ways for supporting future research activities among plat-form members.

Keywords: real-time emulation, wind and tidal turbines, simulation, power flow analysis, distributed generators.

G.18. AN ICT SOLUTION FOR THE REAL-TIME ENVIRONMENTAL MONITORING AND INSTANT ALERT

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Abstract. The developed eALERT platform is a complex system for accurate monitoring in the Chisinau city of the real-time environmental factors through the modern ICT technologies and any type of sensors, with storage, processing, and analysis of big data, as well as instant warning in the case of dangerous natural and anthropogenic hazards. The system processes large amount of data received from different types of monitoring sensors, such as particle matter (PM1/PM2.5/PM10) dust sensor, nitric oxide (NO) gas sensor for low concentrations, nitrogen dioxide (NO_2) high accuracy gas sensor, ozone (O_3) gas sensor, carbon monoxide (CO) gas sensor for low concentrations, sulfur dioxide (SO_2) high accuracy gas sensor, as well as air temperature, humidity, and pressure sensor. Waspmote

Plug & Sense! with attached sensors allow monitoring multiple environmental parameters. It is scalable, easy to deploy and maintain. Any node incorporates a GPS receiver to implement real-time data acquisition. The data can be geolocated on the map. This platform allows easily deploying Internet of Things networks and consists of a robust waterproof enclosure with specific external sockets to connect sensors, solar panel, antenna, and USB cable to reprogram the node. The external solar panel is mounted on a 45º holder which ensures the maximum performance of each outdoor installation. NoSQL database provides instantly incoming data from sensors, and it is used to temporarily store and display them in the user interface. The User Interface (UI) displays all changes in the real-time regime. SQL (data warehouse) is a storage system based on real-time database and relational database. To quickly update UI, the required data are processed in the NoSQL database and then, after performing any data changes, one can immediately update UI. In such a way, at any step of the monitoring process, valid data from sensors are transferred to a storage and analysis system, which represents a relational database. After preprocessing, data are stored in a temporary NoSQL database being ready to be sent to the data warehouse. This is a repository designed for long-term data storage and analytical processing of the environmental monitoring information. In particular, the components for storing data received from sensors are already structured in a convenient form for analytical reports in the UI. The first object is a sensor list (SensorList). It is needed to display all sensors connected to the eALERT platform, also providing information on their configurations and methods of connecting them. Next object is SensorData, which is used for storing data from any sensor. The other two components (Region, City) are required for an accurate geolocation of the eALERT sensors. Currently, an UAV LiDAR system is planned to be integrated as an UAV-based platform, which can be launched as a fully automated, cloud-based LiDAR post-processing solution to capture topography and map pollution areas.
Acknowledgements. The support provided by the National Agency for Research and Development through grants number 22.80015.7007.262T and 20.80009.7007.05PS is gratefully acknowledged.

Keywords: eALERT platform ealert.md, wireless network, sensors, real-time monitoring, environmental data processing.

G.19. MAINTENANCE MANAGEMENT SYSTEM FOR HIDROPOWER GENERATORS

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Abstract. In the context of reducing the share of hydrocarbons in electricity production, Hidroelectrica plays an important role in ensuring Romania's energy needs. Thus, of the total of over 7500 MWh produced in Romania, hydrogen generators provide over 35%. From this perspective, ensuring continuity in the operation of Hydroelectric generators is essential. The current work aims to create a maintenance management system for electric generators in hydropower plants using the LabView programming environment.

Keywords: Lab View Power plant, hydrogenerators.

G.20. PHOTOVOLTAIC OFF-GRID POWER SUPPLY SYSTEM OF A DIDACTIC LABORATORY

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Abstract. This paper presents the realization of an independent (off-grid) photovoltaic generator with an installed power of 1.5 kW located on the roof of the selective waste storage box. The generator serves a didactic laboratory during the day and the outdoor lighting in the laboratory area during the night and the video surveillance system of the storage area. In this paper, mathematical calculations, determinations of the electrical and economic performance indicators of the system are made: - Establishing the energy/power requirement - Calculation of the autonomy of the storage system (battery bank) - General electrical scheme - Connection scheme of physical consumers - Selection and optimal placement of equipment.

Keywords: off-grid, photovoltaic panel, battery bank.

G.21. CONSIDERATIONS ON THE USE OF PVT PANELS FOR ELECTRICITY AND HEAT PRODUCTION IN HOUSEHOLD CONSUMERS

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Abstract. Solar energy is a growing source of renewable energy globally. The development of technologies for electricity and heat production is continuously evolving and supported financially by various development programs in many countries worldwide. Photovoltaic and thermal panels (PVT) are a combination of PV panels and thermal solar collectors that generate both electricity and heat. The excess heat generated in PV cells is removed by solar collectors and is converted into useful thermal energy. Scientific studies show that during the hot season, the reduction of the temperature on the surface of the photovoltaic panels increases their yield. From an energy efficiency perspective, hybrid panels are more efficient than traditional solar panels, as they produce electricity and hot water at the same time. For residential houses, PVT panels are ideal because they generate more energy per unit area. This paper compares two different scenarios for a particular case study to find the best solution for providing electricity and domestic hot water for a householder.

Keywords: PVT panels, electricity, hot water, household consumers.

G.22. ENERGY PRODUCTION USING PVT PANELS

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Abstract. This paper presents a theoretical and experimental study of using PVT panels for simultaneous production of electricity and heat. The advantages and disadvantages of PVT panels are discussed in comparison to using separate photovoltaic panels for electricity and solar collectors for heat production The study was conducted on an experimental stand featuring a SUNSYSTEM PVT 240 panel at the Thermal Power Plant of "Vasile Alecsandri University" in Bacău, positioned at a 45-degree angle to the horizontal and a 0-degree azimuth angle. This hybrid thermal and photovoltaic solar panel can supply domestic hot water during the warm season by absorbing solar heat and transferring it to a heat carrier that circulates in the pipe harp. A cooling fluid is used to cool the photovoltaic panel and can also be used to produce hot water and heating. Mathematical modelling is carried out using Mathcad and Matlab programs.

Keywords: PVT panel, heat, electricity, efficiency.

G.23. IEEE 802.15.4 RADIO SCHEDULER FOR ZIGBEE AND THREAD MULTIPROTOCOL DEVICES

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Abstract. IoT (Internet of Things) devices have become more present in our lives and offer many functionalities that we consider indispensable today. From smoke sensors to smart meters, these nodes are often efficient microprocessors that incorporate a low-power radio that implements protocols specifically designed for such tasks. IEEE 802.15.4 is a commonly used protocol (PHY/MAC) for other higher-level protocols (Zigbee, OpenThread, 6LowPAN, Wireless HART, MiWi), often used in industry. This paper aims to develop a process for planning multiple protocols based on IEEE 802.15.4 so that one device serves multiple roles in diverse types of networks. Implementation and testing were performed on NXP Semiconductors using the NXP MCU K32W061, a device specializing in low-power wireless technologies.

Keywords: IoT, low-power radio scheduler, Zigbee, OpenThread, multiprotocol.

G.24. STUDY ON WHEEL WEAR ON DIESEL-ELECTRIC LOCOMOTIVES USED ON THE RAILWAY NETWORK IN ROMANIA

DANIEL APOSTOL

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Abstract. The present paper aims to find the best solution for connecting electric traction motor so that the wear of diesel-electric locomotive wheel is minimal. Thus, the uses of wheels on diesel-electric locomotives with traction motor connected in series-parallel, as well as on those with traction motors connected in parallel were analyzed. The study was carried out over a period of 2 years and was carried out only on a section operating diesel-electric locomotive.

Keywords: wear, locomotive, moto, operating diesel-electric locomotives.

G.25. STRUCTURAL ANALYSIS BASED ON JATCO JR710E SEVEN-SPEED AUTOMATIC TRANSMISSIONS SYSTEMS

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Abstract. While nowadays the JATCO company builds novel types of transmissions for hybrid vehicles, such as CVT8 Hybrid, mainly as continuous variable transmissions, the model JR710e remains a classic example for quality and maintainability of Japanese mechanical and mechatronic components, gathered in a very robust system. This paper aims to build up an initial analysis of the technical characteristic of this type of transmission system based on both the manufacturer website and the service manuals. The objective of this paper is to describe the schematics and structure of torque converter automatic transmission from the electronic, software and mechatronic perspectives, in order to further evolve towards parallel hybrid vehicles transmission systems technical evaluation.

Keywords: torque converter, clutch, planetary gear mechanisms, solenoids, mechatronics.

G.26. MANUFACTURING AND TESTING OF HIGH VOLTAGE FILTER CAPACITORS

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Abstract. This paper presents the manufacturing and testing methods of 30kV and 33nF high voltage filter capacitors. One of the biggest advantage of small companies is that they are able to produce high diversity of capacitors in small quantities One of the prices of this flexibility is a higher level of manual manufacturing process in production. But this higher level of manual manufacturing does not mean lower quality in the final product. For high quality products in high voltage industry, it is necessary to make routine test in all of the

products. For high voltage capacitors the following three test must be done to ensure quality: voltage strength test, partial discharge test, capacitance and dissipation factor test. The capacitance and dissipation factor test have to be done at different voltage levels. The voltage strength test has to be done at least 20% higher voltage, than the rated voltage. This kind of test give us information not only about the quality of the product itself, but about distribution of the capacitance for example, or about the strength of production process, and about quality management system of the company.

Keywords: high voltage filter capacitors, partial discharge, voltage strength, capacitance, dissipation factor.

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C.24. DELINEATION OF GROUNDWATER POTENTIAL ZONES USING GEOSPATIAL TECHNIQUES. CASE STUDY: ROMAN CITY AND THE SURROUNDINGS OF THE NORTHERN SIDE AREA

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Abstract. Groundwater potential zones are geographically demarcated areas that represent the varying suitability and productivity of groundwater resources, which serve as dependable sources for a wide range of purposes, including domestic, agricultural, and industrial applications. The region of interest (ROI) is situated in the Nort-Est of Romania on the Est part of Neamț county. The methodology involves digital image processing, DEM evaluation, and field studies including hydrogeological and structural investigations. All collected data were integrated into a GIS for comprehensive analysis and assessment of groundwater controlling parameters. Thematic maps were converted into raster datasets with consistent pixel sizes. Each map was assigned different weight values based on its capacity to control groundwater potential within the study area. Reclassification of each map was performed according to the assigned weight values, with higher values indicating higher controlling capacity. The analysis and integration of various thematic maps and image data proved valuable in delineating zones of groundwater potential and zones suitable for domestic purposes in terms of groundwater quality. The results categorized in to four categories: poor, moderate, good and very good, where the first indicate a low suitable area for groundwater prospect, while the very good indicates the most suitable zone. Integration of GIS and remote sensing techniques is a highly efficient, valuable, and cost-effective approach for identifying and delineating groundwater potential zones.

Keywords: delineation, groundwater, GIS analysis.

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CONFERENCE ORGANIZED WITH THE SUSTAIN OF THE "ASOCIATIA DE SPRIJIN ACADEMICA"

ISSN 2457 - 3388

„Alma Mater” Publishing House, Bacau
2023