

## A. ORAL PRESENTATION

### REDUCTION OF COLD FORMING STATION DESIGN FOR RIVETS

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#### Abstract

In this report; Bolt Fastener Co. , using the cold forming method, the reduction of the number of special rivet stations produced by cold forming technique is handled with the support of the finite element analysis method. The aim of being within the competition limits of the sector without creating a negative impact mechanical and metallographical properties of the product and reducing the operation steps will create the cost advantage with the technological gain to the firm. In this mold design phase, new mold designs were realized as a result of riveting, stabbing, and 2 operations and productivity analyzes with square cross-section flange geometry produced by studs and 3 operations. Reduction in the number of operations affects factors such as forging force, die pressure, material flow, material mechanical properties. Another factor is; the effect on the strain distribution in the new mold designs applied to reduce the operation and the flow of material that it has created is different. By controlling the change in hardness in the cross-sectional area, the mold design was carried out in such a way that the minimum hardness increase occurred.

**Keywords:** Plastic Forming, Cold Forming, Rivet, Finite Element Analysis Method

## COMPARISON OF EFFECTS OF MATERIAL COMPOSITION ON PLASTIC DEFORMATION AND THE PRODUCT BY USING SIMULATION

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### Abstract

The objective of this study is analyzing of the mechanical and metallurgical properties of the same product produced by cold forming method using different quality raw materials. The effects of the material composition on both the plastic deformation and the product are compared with simulation support. 20MnB4 and C35B are preferred from the reformable steels (EN ISO 10263-4, TS 10269) which are used for cold forming as raw material. The rivet connection element is produced with these raw materials is analyzed in order to get information about their microstructure orientations. The values obtained by the finite element simulation program, which is simufact forming, has been compared.

**Key Words:** Cold Forming, Difference of Composition, Rivet, Microstructure

## SIMULATION SUPPORTED PROCESS DESIGN OF STAINLESS STEEL FASTENER PRODUCED BY PLASTIC FORMING METHOD

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### Abstract

In this study, in cooperation with Bolt Fasteners R&D, it is aimed to improve the production process of stainless steel fastener which is planned to be produced by using the cold forging process which is one of the plastic deformation methods. The product and the mold designs will be analyzed with using the finite element method. Simulation of the accuracy of the product geometry rather than being tested by the trial production provides advantages in the mold costs and work plan.

**Keywords:** Plastic Deformation, Cold Forging, Fastener, Stainless Steel

## STRUCTURAL AND LUMINESCENCE PROPERTIES OF ZINC STANNATE NANOPARTICLES SYNTHESIZED VIA SOL-GEL AND FLAME SPRAY PYROLYSIS TECHNIQUE

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### Abstract

Zinc Stannate ( $ZnSnO_3$ ,  $Zn_2SnO_4$ ) as a renowned multifunctional oxide has attracted widespread attention due to its intrinsic properties like wide band gap ( $\sim 3.85$  eV at room temperature), high transparency in the visible region, non-toxicity, high chemical response, low-cost and abundant availability of raw materials, and their application potential in many technological areas such as piezoelectric sensors, gas sensors, photocatalysis, lithium-ion batteries, and solar cells [1].

In this study, zinc stannate nanoparticles were synthesized using the two different methods as sol-gel and flame spray pyrolysis (FSP) technique. The structural properties of synthesized nanoparticles were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM) and X-ray photoelectron spectroscopy (XPS). Also, photoluminescence properties (excitation, emission) and decay times were investigated by time-resolved fluorescence spectrometer.

**Keywords:** Zinc Stannate, Sol-Gel, Flame Spray Pyrolysis, Luminescence, Nanomaterial

## OBSERVATION of MARINE AREAS (ÇANDARLI AND GÖKOVA BAYS) and THEIR BIODIVERSITY

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### Abstract

Çandarlı and Gökova Bays are defined as "Special Environmental Protection Area (SEPA)" by T.R. Ministry of Environment and Forestry, Special Environmental Protection Agency Presidency. This project aimed to investigate the observations of Çandarlı and Gökova Bays; *i*) a detailed description of the habitats and facies in the studied areas, *ii*) determination of species number and diversity and *iii*) retrieval of underwater photo recordings. In the literature, it is seen that the existing ecological conditions and habitat characteristics of the areas restricted to SEPA and fisheries are studied in detail. Thus, a comprehensive database is developed that will be extremely useful in terms of future works. On the other hand, the studies carried out are particularly inadequate for marine algae (macro algae) in the related areas.

**Keywords:** Çandarlı Bay, Gökova Bay, Marine Algae, Marine Organisms, Monitoring, SCUBA

## A COMPARATIVE STUDY: ZINC PHOSPHATE-SOAP COATING VERSUS POLYMER BASED COATING IN COLD FORWARD EXTRUSION

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### Abstract

Cold forging process provides to produce high quality components with complex geometries and near net shapes. However, tools in cold forging operations are exposed to high mechanical stresses and extreme tribological conditions due to high normal stresses. The tribological condition of tool and material is so effective on the tool life and surface quality of the product. One of the parameters that affects the tribological conditions in cold forging is coating of the work-piece. The zinc phosphate-soap coating is mainly used in the cold forging industry however that coating includes heavy metals and leads to generation of hazardous waste. Polymer based coatings are designed to avoid of the above-mentioned disadvantages of zinc phosphate-soap coating. In this paper, 23MnB4 forging steel was coated with zinc phosphate-soap and polymer and flow behavior were compared by conducting cold forward extrusion tests. Numerical models of extrusion tests were also prepared in simufact.forming finite element software to determine the friction coefficient between the work-piece and tool. The results showed that the tribological performance of polymer coating is very close to traditional zinc phosphate-soap coating.

**Keywords:** Cold forging, Lubrication, Tribology, Friction, Friction Coefficient

## INVESTIGATION OF THE USE OF TEXT MINING TECHNIQUES IN SOCIAL NETWORKS FOR TURKISH AND ENGLISH LANGUAGES

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### Abstract

The development of technology has increased the use of social networks. With the frequent use of social networks, the stacks of non-structural data stored on these platforms have also increased. The extraction of hidden and useful information from non-structural data is carried out through text mining techniques. The hidden and useful information obtained by text mining techniques are done through texts that are structured with natural language processing. It is very difficult to work with non-structural data on Turkish texts and to reach meaningful results. In this study, text mining applications which are performed by using social media data were examined. When the performances of studies which were conducted for Turkish and English languages were examined, it was seen that Turkish studies had lower performance than similar English studies.

**Keywords:** Text Mining, Social Networks, Natural Language Processing

## AN IMPROVED SPEED CONTROLLER FOR PMSM DRIVE WITH UNBALANCED LOAD USING LOAD TORQUE OBSERVER

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### Abstract

In order to overcome disturbance effects as load torque variations in Permanent Magnet Synchronous Motors of washing machines, an improved controller with feed forward compensation is presented in this paper. A few load torque observer techniques have been studied and combined with several sensorless control techniques. The observed torque is used as feedforward in q-axis current PI controller to compensate the output reference q axis current of speed PI controller. Simulation and experimental results show that in a disturbed operating system as washing machines, PI controller response time can be improved by adopting an accurate feedforward scheme.

**Keywords:** Field Oriented Control (FOC), Washing Machines-Unbalanced Load, Sliding Mode Observer, Load Torque Observer

## PRODUCTION OF *CHLORELLA SP.* IN A DESIGNED PHOTOBIOREACTOR

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### Abstract

Micro-algae are photosynthetic microorganisms which are recently grown to produce a biomass for food, pharmaceutical, dye and bioenergy industries. Over the years, there have been several advances in the design and operation of closed photobioreactors for microalgal cultures based on new reactor geometries as well as optimized aeration and mixing strategies. One of the most important factors that control cell growth in a photobioreactor is light availability. In this study, cultivation of *Chlorella sp.*, as microalgae were performed in specially designed photobioreactor for productivity analysis and the pigment capacity analysis. The applied light energy was kept constant while applying either continuous or intermittent lighting during the growth of microalgae. The cultivation parameters were tested to find the optimal light mode due to the continuous light or 12h light/ 12h dark cycle to maximize pigment amount.

In order to determine the pigment amount in the cultivated algae extraction was done. Then by using UV spectrophotometer amount of chlorophyll a and b were determined in the obtained extracts.



Figure 1. The pictures of designed photobioreactors; left: outside view, right: inside view.

**Keywords:** Microalgae, *Chlorella sp.*, Photobioreactor design, Extraction, Pigments

## EXTRACTION OF CHLOROPHYLL FROM NATURAL SOURCES FOR INDUSTRIAL APPLICATIONS

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### Abstract

Chlorophyll is a natural pigment produced by green plants and algae. In photosynthesis, chlorophyll works as absorbent of the sun which is used to synthesize carbohydrates from carbon dioxide (Raven et al., 2005). Other than photosynthesis due to its green color chlorophyll has many other applications like coloring agent in food, cosmetic and pharmaceutical industries. Recently demand for natural pigments like chlorophyll has dramatically increased in order to replace artificial additives. In addition to that chlorophyll and its derivatives have health benefits like antioxidant and anticancerogenic and play a role in the prevention of chronic diseases (Lanfer-Marquez et al., 2005, Mario et al., 2007).

In our study extraction of chlorophyll was studied with various solvents like glycerin, ethanol and acetone in order to find optimum extraction parameters. Thin layer chromatography (TLC) was used for the determination of presence of chlorophyll a and b. For the extraction of chlorophyll pure acetone was chosen due to better extraction of chlorophyll a and b. After presence of chlorophyll a and b determined, UV spectrophotometer was used to calculate amount of chlorophyll extracted from natural sources.

**Keywords:** Extraction, Chlorophyll, Natural Pigments, Natural Additives, Antioxidant Properties

## MULTIAXIAL FATIGUE TESTING OF SUSPENSION COMPONENTS USING SERVOHYDRAULIC ACTUATORS

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### Abstract

Due to the perpetual development requirement of the age, the improvement times being shortened. Especially, the parts concerning safety, control, and comfort surge up; so as the testing demand. To prove the claims of R&D, and P.D. departments the testing methods are being improved in terms of time, accuracy, controllability, and cost day-by-day.

In conventional testing methods, the product is designed via calculation formulas with or without computerized methods, build and tested in the field. This method requires the whole system, operator and the testing field; all of them are at risk during the process.

Multiaxial Servo hydraulic testing method can use different inputs like Road Load Data and/or Block Cycle Data. With this method; system, sub-system or a small part can be tested separately. Thus, the whole system should not be invested, and risked at all. Once test starts, the testing system controls the test with special feedback controls. So, this method requires less labor, and no one will be at safety risk at all. The test can run without interruptions except for the test procedure requirements, so that time can be shortened. The testing environment can be designed to match the requirements.

**Keywords:** Servo hydraulic actuators, multiaxial fatigue testing, road load data, block cycle.

## SOL-GEL PROCESS OPTIMIZATION FOR THE ABILITY OF Ta<sub>2</sub>O<sub>5</sub> COATING LAYER ON AZ91 Mg ALLOY

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### Abstract

In this study, synthesis of Ta<sub>2</sub>O<sub>5</sub> powders via sol-gel method and Ta<sub>2</sub>O<sub>5</sub> coating ability onto AZ91 Mg alloy were investigated. AZ91 Mg alloy was chosen as a substrate because of its low density and similar mechanical properties to bone. However, AZ91 Mg alloy cannot maintain mechanical integrity in biological environment for a long time, accordingly several surface treatments are necessary.

Ta<sub>2</sub>O<sub>5</sub> is a promising coating layer for biomedical applications, because of its excellent corrosion, wear resistance, and biocompatibility. In the case of Ta<sub>2</sub>O<sub>5</sub> coatings applied on AZ91 Mg alloy, which is advantageous in many respects, can be used in long term applications within the body.

For this purpose, AZ91 Mg alloy samples were produced by using powder metallurgy method. Ta<sub>2</sub>O<sub>5</sub> solution was prepared, dried and sintered. The surface morphologies of dried Ta<sub>2</sub>O<sub>5</sub> powders and Mg alloy surfaces were investigated by optical microscopy and X-ray diffraction (Bruker, D8, Advance). Dried Ta<sub>2</sub>O<sub>5</sub> powders were analyzed using combined thermogravimetry-differential thermal analysis (TG/DTA Hitachi STA7300).

As a result, the way for preparing the coating solution was optimized and drying and sintering temperature were determined.

**Keywords:** Tantalum oxide, Sol-gel, Biomaterials, Protective coatings.





## INNOVATION AND COMPETITION

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### Abstract

Competition law is one of the legal pillars of the market economy. The competition law provisions, which are part of the market structure, protect the competitive market structure against limiting behaviors. It attempts to provide a market structure in which competition freedom exists, by prohibiting the anti-competitive behavior of enterprises. In this sense, competition law is the guarantee of a minimum and at the same time effective competition for all market participants.

**Key Words:** Innovation, competition, competition law, consumer welfare

## APPLICATIONS of BIOLUMINESCENT MICROORGANISMS

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### Abstract

Bioluminescence is the ability of a microorganism to product and emit light for different aims such as communication, camouflage, illumination, defense and sexual attraction. It can be described as a final product of a biochemical reaction which includes the decomposition of luciferin by luciferinase in the presence of oxygen in eukaryotic life which found in deep sea. Bacteria, protozoa, fungi, molds, jellies, insects, fish can be given as examples of the bioluminescent organisms. Bioluminescence can be used in various biotechnological tools with high detectability. Bioluminescence is used in clinical, diagnostic and drug discovery applications and monitoring of biological processes *in vitro* and *in vivo*. The bioluminescence feature also allows to create glare in plants and textiles to enhance visual attraction which make them a suitable candidate for architectural applications. In future trends, there are studies on the power generation of photovoltaic panels by the energy generated by bioluminescence, minimize of electricity uses, creating a mini ecosystem.

**Keywords:** bioluminescence, microorganism, applications, biotechnology, luciferinase

## INNOVATIVE FOOD PRODUCT IN SOLEN CHOCOLATE

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### Abstract

A new product which is called ‘Grain Sandwich Bar Filling with Caramel’ under a new brand name ‘Boombastic are improved by the Solen company. When developing this product, flavour studies were done for binding syrup recipe; the syrup dry matter was fixed with suitable cooking temperature; mixed syrup and grain mixing ratios were determined and process application temperatures were determined, were done between the 110°C and 115°C for temperature of syrup cooking also working were done between the 80 and 88 for Brix° value. According to the this result of differences R&D and innovation blue ocean approach used in product development stages.

**Keywords:** R&D, Innovation, cereal

## STACK-UP ANALYSIS FOR CONDENSER OF TUMBLE DRYER

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### Abstract

Climate change and socio-economic development increased demand of tumble dryer rapidly recent years. Increasing of demand leads tumble dryer sector be more competitive in technology, drying level, energy consumption and program duration.

Condenser tumble dryers have a major share of tumble dryer market. Condenser, where condensing is occurred, is one of the most important parts of condenser tumble dryers. Condenser efficiency effects drying level and program duration directly. Assembly of condenser to the dryer is significant for accuracy and efficiency of system. Dimensions and tolerances of parts is determined by system dynamics, flow calculations and flow analyses. Dimensional tolerances are determined by the aid of stack-up analysis as well as functions and manufacturing of individual parts. Tolerances of each parts of system are added ensuingly as possible lowest and highest values in order to determine tolerances of system. Dimensions and tolerances of parts are optimized by the aid of system tolerance is gathered by stack-up analysis. In this study, direct effects of tolerances and interactions of parts on product performance is shared.

**Keywords:** Tumble Dryer, Condenser, Stack-Up Analysis

## BUCKLING SAFETY ASSESSMENT FOR THE MULTI-AXLE STEERING LINKAGE OF AN 8x8 SPECIAL PURPOSE VEHICLE

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### Abstract

Vehicle steering mechanisms are generally considered as safety sub-systems due to their control and stability functions. Therefore, structural elements of a steering linkage should strictly resist the service loads without any overload failure. This paper reports an exemplary buckling evaluation case study of the multi-axle steering linkage tie rods which will be used in an 8x8 special purpose vehicle. In the first part of the study, full multibody dynamics (MBD) model of the vehicle including the steering linkage was composed by using Adams/Car™ commercial software. With this model, handling simulations were carried out to determine the service loads for various driving conditions. In order to verify the MBD model, reaction forces occur at the linkage joints were also calculated by using detailed finite element (FE) model of the entire system for the same driving conditions. In the final part of the work, buckling safety of the tie rods was assessed for the critical load case. In this way suitability of the system was evaluated in terms of buckling.

**Keywords:** 8x8 vehicle, multi-axle steering, multibody dynamics (MBD), simulation, finite element analysis (FEA), computer aided engineering (CAE)

## TERMINAL CRIMP FAULTS and EFFECTS ON MECHANICAL STRENGTH

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### Abstract

The need for crimped cables is a growing market in many fields such as automotive, medical, white goods and electronics. The terminal crimping process includes applications that vary depending on many parameters such as the cable material, cross section of wire, terminal type, terminal material, crimping technique. In this study, we have focused on the commonly encountered crimping faults. The results that can be caused by faults in the crimping process are exemplified by using the Failure Mode Effect Analysis (FMEA) method. In practice, the tensile test results of the faulty crimping operations in which shearing apparatus cut the cable cores were compared the right process in the classical terminal crimping made with PVC insulated copper cable. In addition, information and application examples are given about the crimp to crimp machines and their manufacturing processes.

**Keywords:** Wire terminal, crimping, electrical contacts, crimp to crimp machine.

## VIBRATION AND ACOUSTIC ANALYSIS OF A REFRIGERATOR CABINET BASE PLATE

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### Abstract

Vibration and acoustics analysis of a refrigerator cabinet base plate by using Theoretical Modal Analysis by Finite Element Method and Experimental Modal Analysis had been done in this research study.

The aim of the first important part of this study is to provide the theoretical background to the readers. Other parts are presented for theoretical modal analysis of cabinet base plate which is carried out by using solid element in ABAQUS and experimental modal analysis that is accomplished by using dB4-1 Mobil Analyser and its connections.

In conclusion, the modal parameters found from both numerical and experimental methods are compared and good agreement is found. After determining the agreement, the proper modification has been done for the system which generates undesired sound due to the natural frequency.

**Keywords:** Acoustics, Resonance, Vibration, Modal Analysis.



## USING UVC REGION RADIATING LED ARMATURES AS BACTERICIDE FOR EXTENDING SHELF LIFE OF FRESH MEAT

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### Abstract

There are various mechanisms for extending the shelf life of meat and meat products, from traditional thermal processes to chemical methods, to reducing water content or to packaging systems. Most conventional preservative methods have a really strong effect on the matrix; It can prevent bacterial deterioration, but it can cause sensory changes such as taste, odor, stiffness, which is not possible for consumption, mostly which makes undesirable chemical reactions and product different. Therefore, Ultraviolet (UV) light technology emerges as a protection procedure, which preserves its effectiveness on microbial activity. Conventional UV radiation instruments are not practical. They have low efficiency, long start up times and high operation temperatures despite to be used in refrigerators. LED technologies offer an economic and practical way to produce UV radiation for extending shelf life of foods. In this study UV radiated LED chips are used to produce 255 nm wavelength radiating light as known UVC. Pseudomonas, Micrococcus, and Staphylococcus species have been used in Meat Liver Agar solution. Applied dosages are around 0-6 kJ/m<sup>2</sup> and 4-5 log cfu·g<sup>-1</sup> reduction has been obtained.

**Keywords:** Microbiological Contamination, UVC, LED, Shelf Life Extending

## SIMULATION ANALYSIS OF CLINCHING JOINT PERFORMANCE BASED ON SOME PROCESS PARAMETERS

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### Abstract

Clinching process has been widely used for nearly 20 years in the automotive and white goods industry. Clinching is a joining method where the sheet metal parts are locally deformed and no additional elements are used. The first patent pertaining to clinching was granted as early as 1897. However, the significance and potential application of the method in industrial joining practice was not fully appreciated until the 1980s.

In sheet metal and metal profile joining processes, clinching or press joining becomes more importance as a joining method connected to a form or force. The joining elements are directly shaped out of the sheet metal to be joined. In this process replaces mechanical fasteners such as bolts and rivets, as no pre-drilled holes are required to join the two layers.

At this paper we will simulation analysis of clinching joint performance based on mold parameters such as friction, sheet material and thickness etc.

**Keywords:** Clinching, sheet material, simulation analysis, clinching parameters

## INVESTIGATION OF NOTCH IMPACT CHANGE WITH 30MnB5 STEEL DOUBLE TEMPERING

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### Abstract

The cured hardened steels are generally not used directly as a machine part because their impact resistance is low. It is also desirable that such machine parts be tough as well as high stiffnesses. These steels, which are martensitic after quenching, have less internal stresses after tempering and lower internal stresses including microstructure and bainite. Thus, these steels have lost a little bit of hardness, but increased toughness.

In this study, the hardness and impact strength of 30MnB5 steel at the end of quenching and double tempering were investigated. It was determined that the average hardness was 59 HRC and the impact resistance was around 3.2 Joule. In these mechanical properties, it is not appropriate to use this steel as a machine part. The hardness value decreased to 49.3 HRC after double temperature was applied to this hardened steel. In return, the impact resistance increased to 58.8 Joules.

**Keywords:** 30MnB5, Heat Treatment, Double Tempering, Impact toughness

## IMPROVING GLASS FIBER MESH REINFORCED POLYMER CEMENT COMPOSITE TO USE AS TOP COVER IN MAJOR APPLIANCE INDUSTRY INSTEAD OF CHIPBOARD

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### Abstract

In this study Glass Fiber Mesh Reinforced (GFMR) Polymer Concrete Composites (PCC) has been improved and evaluated to use as top cover in Major Appliance industry instead of chipboard. To determine the effect of different rates of glass fiber mesh, inorganic filler and epoxy emulsion on the compression and tensile strength of concrete with fixed water / cement ratio static mechanical tests performed. Next to conventional mechanical tests as tensile and compressive (crushing) tests, more than 14 tests had been performed for using it safely in major appliance industry. PCC panel performance has been superior to chipboard according to mechanical strength, moisture, humidity and solvent resistivity, electrical resistivity, ultraviolet durability, environmental conditions, acoustic insulation and wear resistance. Next to these superior properties, panels are peculiar low cost and economically feasible. The only disadvantage observed is that its weight is 2 times higher than the available chipboard panels.

**Keywords:** Glass Fiber Reinforced Concrete, Precast, Polymer Concrete Composites, Glass Fiber Mesh, Major Appliance Top Cover

## INCREASING THE PRODUCT RANGE OF INTER ABRASIV BY DEVELOPING HIGH PERFORMANCE and DURABLE FILM ABRASIVE

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### Abstract

Film abrasive is a type of coated abrasive that consists out of backing material –polyester film - to which is bonded of with abrasive grain. An initial make coating of resin is applied to the backing, the abrasive grain is then electrocoated onto the surface, followed by a second or size coating of resin to lock in the abrasive particles. After an oven curing, the resulting materials are converted into various forms, shapes and sizes of roll, sheet, disc with or without holes.

Usage of film abrasive is common in industry like as automotive, wood, aviation, furniture, metal and plastic for polishing and as special tubes for microfinishing application.

Compared to other backing the film has high tear resistance, perfect coating surface, usage of wet and dry ease. Therefore our target is that useful product will manufacture by our company.

The results of laboratory trial and production line samples were successful and will start mass production for film abrasive.

**Keywords:** Abrasion, Polishing, Microfinishing

## DETECTION OF MYCOTOXINS WITH BIOSENSORS FOR ASSURANCE OF FOOD SAFETY

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### Abstract

Mycotoxins are toxic fungal metabolites which can occur in many kinds of fresh and/or processed foods due to mould growth. Mycotoxin occurrence can be seen in primary food products such as cereals, dried nuts and fruits, spices, coffee, etc., being an important safety issue that mycotoxin accumulation in the body results in chronic damage to liver, cancer and even death. Therefore, detection of mycotoxins with high sensitivity is important. Conventional detection techniques are based on chromatographic methods (HPLC, TLC) or enzyme-linked immunosorbent assay (ELISA) with high sensitivity. But recently, researchers have focused on easier, more practical, economic and less time consuming techniques with accurate and low detection limits. At this point, biosensor technology and bioelectronics provide promising alternatives making possible highly selective&sensitive, time-saving analysis with less labor. Biosensors can be defined as analytical tools for recognition of an analyte or a group of analytes with special interactions. So, there can be many kinds of biosensors with different working principles including nanomaterial based optic, electrochemical and piezoelectrical biosensors. This emerging technology will probably find a wide application area in food industry and control laboratories in the future as a result of great effort to enhance current status.

**Keywords:** Mycotoxins, Biosensors, Food safety.

## CLASSIFICATION OF RESPIRATORY SOUNDS USING MACHINE LEARNING METHODS

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### Abstract

Due to each physician has different knowledge and experience, there is a problem about the diagnosis and treatment of respiratory system diseases. This study will help the physician to easy decide in various difficult diagnostic situations. For this purpose, some models have been constituted to classify respiratory sounds as healthy and patient. The best classification was obtained as 92.31% with the model created using Mel-Frequency Cepstral Coefficient and Artificial Neural Network methods.

**Keywords:** Respiratory sound, mel-frequency cepstral coefficient, empirical mode decomposition, k nearest neighborhood method

## GENERATION OF ELECTRICITY FROM MICROALGAE HYDROGELS

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### Abstract

Recently, the increasing popularity of microalgae is first known to be used as nutrient 2,000 years ago. Microalgae can produce organic matter from inorganic substances and obtain biomass energy that is renewable energy. In renewable energy systems, used energy can be recycled in a short time and continuously. For these systems, high energy potential and easily available sources are preferred. At the same time, renewable energy sources have gained importance because they can be easily found all over the world. Microalgae with this potential; Thanks to their advantages such as photosynthetic properties, rapid proliferation and easy growing, they have become a new source of hope for renewable energy. Nowadays, photosynthetic microbial fuel cell systems used in biotechnology have been developed using microalgae. In these systems, the electrons produced by photosynthesis of microalgae are transferred from the anode to the cathode and electrical energy is obtained. As a result of this study, the desired difference to the literature is the replacement of the fluid microbial fuel cell system with the stable hydrogel system. Thus, the product can be made into a portable and changeable system to produce in different sizes.

**Keywords:** Renewable energy, photosynthetic microbial fuel cell, microalgae, hydrogel, electricity generation, consumable battery.

## PRODUCTION OF IMMOBILIZED HERBAL INSECTICIDE FROM PHENOLIC COMPOUNDS

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### Abstract

Insects are one of the problems encountered in agricultural production. These species damage the plant by feeding on the root, stem, leaf and fruit part. Several methods have been developed to struggle these pests. Although chemical insecticides which are commercially appropriate are more preferable in agriculture. However today biological insecticides are gaining importance against chemical insecticides. One of the most important advantage of biological insecticides is, it has no damage to plants. Some of the components contained in the plants are used as biological insecticides. These components are obtained by extraction methods from various plants. Insecticidal components are extracted from pyrethrine flowers, rotenone roots, sabodilla seeds, ryania shoots, capsaicin, nicotine and neem leaves. In this study, the aim to produce an insecticide consisting of a mixture of pyrethrins and capsaicin. This type of herbal insecticide is designed that capsaicin and pyrethrum have different mechanisms of action and affect on different insect species. Also encapsulation of these biological products is also a new feature that will seen in literature.

**Keywords:** Insects, Capsaicin, Pyrethrine, Herbal Insecticide



## AN INTEGER LINEAR PROGRAMMING MODEL FOR A LOCATION ROUTING PROBLEM WITH TIME WINDOWS

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### Abstract

As the world is globalizing and trade volumes are increasing, logistics industry is getting much more attention. Competition in the industry is also increasing. Therefore, the good quality and timely deliveries are of main concern of logistics firms. In order to deal with this problem, logistics firms try to determine the optimum depot locations and the optimum routes of the vehicles from these depots. This problem is known as the Location-Routing problem in the literature. In this study, a variant of LRP which incorporates time windows is considered. For the investigated problem, a linear integer programming model is developed. The performance of the proposed model is evaluated on hypothetical problems. The results are visually presented and discussed.

**Keywords:** Location-Routing problem, Integer programming, Time windows

## PRESS FORCE DETERMINATION OF SHRINK-FITTING PROCESS BASED ON NUMERICAL ANALYSES

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### Abstract

Shrink-fitting process of forging dies has a key role on forging die life. In the production of cold forging dies, used in manufacturing of fasteners, shrink-fit method is applied under a press force. A typical cold forging die consists of insert and stress ring. Inserts and stress rings of cold forging dies are assembled to each other by shrink-fitting method. The aim of the shrink-fit method is to create compressive stresses on the insert surface which will act against applied tensile loads to increase fatigue life resistance. In this study, required pressing operation force for the shrink-fitting process was determined. Considering shrink-fitting process, many factors have an influence on final die life, such as outer and inner diameter, die length, shrink-fit ratio etc. Therefore, shrink-fitting simulations were conducted with different conditions and based on the results. As a result of simulations a general graph was obtained so that the required pressing force can be determined before the process.

**Keywords:** Shrink fit, cold forging die, cold forging, press force.

## IMPROVING PERFORMANCE BY PROPER TORQUE CONVERTER: A CASE STUDY FOR 8x8 HEAVY DUTY TRUCK

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### Abstract

Torque converter selection for a vehicle which is based performance calculations to transmit better torque from engine to gearbox, has an important role to improve performance characteristics. Torque converter calculations are investigated for an 8x8 heavy duty vehicle with two couple of diesel engine as power sources to evaluate the vehicle performance. The main purpose of this paper is to show the effects of torque converter selection on acceleration performance and fuel consumption of the vehicle. Powertrain system simulation performed by using two different torque converters individually according to Heavy Duty Urban Dynamometer Driving Schedule (HD-UDDS) drive cycle for this purpose. Torque converter alternatives (D1 and D2) are chosen considering operational area in moment characteristics of the engine. A mathematical model of powertrain system is implemented based on longitudinal dynamics of vehicle motion in HD-UDDS cycle. Required moments on torque converter during the drive cycle are compared for two converter alternatives and loading condition of vehicle. Results are indicated that using proper torque converter can increase the acceleration performance and traction ability of vehicle which are crucial especially for a heavy-duty off-road vehicle.

**Keywords:** 8x8 Powertrain, heavy duty vehicle, torque converter, drive cycle analysis.

## DEVELOPMENT OF A METHOD FOR THE PRECIOUS METAL RECOVERY FROM NICKEL-COBALT MIXED HYDROXIDE PRECIPITATE OBTAINED AFTER HIGH PRESSURE ACID LEACHING OF GÖRDES LATERITIC NICKEL-COBALT ORE

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### Abstract

Nearly 130 million nickel reserves in the world with 1% and more grade, composed of 60% lateritic and 40% sulphuric deposits. META Nikel Kobalt A.Ş. is the first and only company as a producer of Nickel-Cobalt Mixed Hydroxide Precipitate in Turkey via high pressure acid leaching method. In this context, mixed hydroxide precipitate of Meta Nikel was used for preparing the rich nickel and cobalt solution. Obtained solution was exposed to solvent extraction via using Cyanex301, Cyanex272, DE2HPA, LIX84-I and Versatic10 organic reagents. As the result of tests, process efficiencies were examined and compared by each other.

**Keywords:** Nickel, lateritic ore, solvent extraction, leach

## THE EFFECT OF PRE-DEFORMATION IN THE PROCESS OF MANUFACTURING FASTENERS BY COLD FORMING

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### Abstract

In modern fastening technology the majority of fasteners are made using the cold forming procedure. In this procedure, the fastener is formed, usually in multistage processes, by pressure forging, cold extrusion and reducing, or a combination of these procedures. The term solid or cold forming was coined for this type of production. This procedure is usually used for large quantities, because, from an economic aspect, it is the most rational method. In addition, cold forging is an important production process used in the steel construction, machine and automotive industry. Some of the advantages of this process are; increase in mechanical properties of material, high production speed, realization of process at room temperature, producing with precise dimensional tolerances.

This project, the computer simulation program with the help of cold forging modeling model has been made. The connection element consists of 3 operations. Simulation fiction has been designed as 2 different. Initial simulation, pretreatment of the fastener (wire drawing and cutting) has not been performed. In the second simulation, pretreatment (wire drawing and cutting) is applied and the results will be compared.

**Keywords:** Cold Forming, Simulation, Fastener

## EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT AND ECO-FRIENDLY TECHNOLOGIES

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### Abstract

Increasing industrialization and technological developments cause a rapid increase of production and consumption. As a result of this situation, air, water and soil are rapidly polluted and at the same time, natural resources are consumed. The self-renewal power of nature has been damaged. While pollution in developed countries appear as a result of industry progress in parallel with technology, in developing countries, as a result of the necessity of making a choice between the economy and the environment appear. With the rapid deterioration seen in the natural environment, the concern associated with approaching the the end of world resources has changed the perspective for the ecological environment and has showed that the ecological environment should be considered as an important factor in science / technology activities.

The managerial understanding which take ecological environment as an important factor in the performed activities, aim to minimize or completely destroy the damage to the environment, renew the production processes and adopt a philosophy the protection of the ecological environment are considerable important. In this context, we aimed to explain concepts such as eco-friendly technology, appropriate technology and eco-sensitive technology to examine eco-sensitive technology samples which are currently used or begun to be developed.

**Keywords:** Environment and technology, environmentally friendly technologies

## THE TERAHERTZ IMAGING OF MALIGNANT CELLS WITH CONVOLUTIONAL TIME REVERSED FDTD METHOD

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### Abstract

A novel approach for the detection of malignant cells in terahertz region is presented. The implemented method is based on the convolutional time-reversed finite difference time domain (FDTD) algorithm in three dimensions. The proposed computationally efficient technique allows the reconstruction of images of malignancies from reflected terahertz signals. The method reconstruct images with much higher resolution than conventional terahertz imaging techniques based on peak-to-peak intensity and time delays using the same set of measured data. The technique is capable of differentiate malignant, fatty, and fibrous cells due to their different electrical properties. The non-ionizing effect of terahertz radiation on healthy tissue makes it future diagnosis method in medical imaging.

**Keywords:** Terahertz imaging, malignant cells, time reversed FDTD, cancer detection.

## PARAMETRIC ANALYSIS OF THE COOLING CHANNELS IN LPDC

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### Abstract

Low pressure die casting (LPDC) process is the preferred method to manufacture cost effective automotive wheels. Cooling systems and channels of a LPDC mold are critical to obtain better mechanical properties. The aim of this project is to optimize the cooling channels of a mold to reduce the air consumption. CFD is utilized to model heat transfer calculation and mass flow rate, also for the optimization of the position and geometry of these channels. As a final step, computational results are compared with experimental results.

**Keywords:** CFD, Cooling Channels, Mass Flow Rate, Optimization, Simulation

## STATIC ANALYSIS OF REVISED TOP PLATE IN LPDC MACHINE

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### Abstract

Non-value adding process such as preparing the tools or manual tightening may cause higher cycle time. A decrease the non-value adding process reduces not only product cost but also intense work environment. In this study, mold clamping assembly problem is solved by torque wrench tool to reduce cycle time and to improve ergonomic process. This type of solution may cause another assembly problem which can be fixed by revision on the part. In related process, torque wrench tool can be only used on assembly process with revision on the top plate in LPDC machine. The geometrical revision in the system may also trigger static structure problem. In this study, revised geometry is analyzed statically and present the effects of revision. According to analysis results, the revision can be applied to top plate geometry in the LPDC machine.

**Keywords:** Geometrical Revision, LPDC Machine, Static Analysis.

## FINITE ELEMENT ANALYSIS OF BROKEN MOLD IN LOW CYCLE IN AXIAL JOUINT MANUFACTURING

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### ABSTRACT

Cold forging is a process; which occurs at room temperature, oxide layer during the production does not occur, dimension precision final product, tolerances are very low, production speed is fast and the final product surface and mechanical properties are better than alternative production methods due to the advantages such as the fact that it is used as a production method to complex workpieces. Higher forging forces occur during cold forging operations in contrast to warm or hot forging. In this study, stress analysis of cold forging dies which failed in low forging cycles during production of low carbon steel alloy steering tie rod socket was carried out and reasons of the failure evolution were determined. Finite element simulations of cold forging operation and die stress (effective and principal stress) analysis were solved by using finite element software SIMUFACT FORMING. Simulations revealed that stresses occurred on the die during forging of the steering tie rod socket were enough to cause plastic deformation. As a result of the study, die life had been improved by changing die material and shrink fit ratio.

**Keywords:** Cold Forging, Simulation, Fracture analysis

## SLUDGE CONTROL SYSTEM FOR MARBLE FACTORIES BY USING LIGHT SENSITIVE SENSOR

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### Abstract

This study presents a sensitive and non-contact optic sensor design to use in a sludge control system for a marble factory. Hence, it will be possible to determine the critic concentration of the marble dust in a water-marble sludge with ease. The concentration of the dust in sludge must be kept in determined values so as to prevent possible serious problems seen at motile parts of machines used in treating marble blocks.

**Keywords:** Marble Factory, Sludge Control System, Non-Contact Measurement.

## APPROXIMATE SOLUTIONS OF THE STRONGLY NONLINEAR DUFFING OSCILLATOR WITH FRACTIONAL DERIVATIVE DAMPING

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### Abstract

To find exact analytical solution of the physical systems is usually impossible for most of the time. For this reason, approximate analytical methods are developed for solving mathematical models corresponding to physical problems. Perturbation methods are used efficiently for finding approximate analytical solutions in many physical problems. Perturbation methods are valid for weakly nonlinear systems due to the assumption of small parameters. To overcome this deficiency, methods, such as linearized perturbation method, Lindstedt-Poincare method with modified frequency expansion, parameter expanding method and homotopy perturbation method were developed within time.

A relatively new method which gives valid solutions for both weak and strong nonlinear systems has been developed. The method is called Multiple Scales Lindstedt Poincare (MSLP) which is combination of method of multiple scales and Lindstedt Poincare techniques.

In this work, MSLP method is applied to strongly nonlinear Duffing oscillator with fractional order damping term for the first time. Approximate analytical solutions are obtained via classical multiple scale (MS) method and MSLP methods. The obtained solutions are compared with numerical integration solutions. It has been found that the MSLP method provides acceptable solutions for strong nonlinearities, while MS solutions are not suitable for the strong nonlinearities.

**Keywords:** Fractional Duffing Oscillator, Strong Nonlinear Systems, Multiple Scales Lindstedt Poincare Method

## COMPARISON OF ALTERNATIVE ELEVATOR SYSTEMS FOR AN INTENSE LIFT TRAFFIC BUILDING USING SIMULATION MODELLING

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### Abstract

Elevator systems have very many different types of applications in all kinds of buildings. The number of elevators and the working principles should be considered according to the type and requirements of the building. Simulation modelling can be a beneficial method in order to evaluate the elevator system before its installation. Therefore, in this study, simulation modelling is used to evaluate an elevator system of a building with intense lifting traffic. Firstly, a single elevator is considered for the building. The system is modeled using discrete event simulation. The two important factors handled in this study are the interarrival time of passengers, which represents traffic intensity for the elevator, and the batch size, which represents the number of passengers that prefer to travel together. Several different traffic intensity values are tested. As an alternative elevator system, elevator capacity is decreased to half and the number of elevators is increased to two. Alternative simulation model is also tested with similar traffic intensity values. The results of the two alternative models are compared in terms of average time passengers spend in the system/queue, average number of passengers in the system/queue and utilization of the system.

**Keywords:** Elevator system, simulation, batch capacity.



## INDUCTION HEATING APPLICATION WITH EXAMPLES IN FOOD INDUSTRY

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### Abstract

Thermal applications, which are among the most basic processes in food processes, bring high investment and operating costs. Minimizing steam, hot water etc... requirement with systems with high energy efficiency are of utmost importance for the sector. From this point of view, electromagnetic heating technology, which is among the preferred systems in metallurgy due to high security and efficiency, also promises hope for the food sector. However, induction applications in the food sector are still in the very early stage and there are very few patents and literature surveys in the literature. However, in industrial food applications, systems with induction were not encountered. Especially in high energy requirements such as evaporation, drying, cooking, pasteurization and sterilization, it is thought that the use of induction is extremely advantageous and there is limited number of researches in the relevant fields. This situation shows that induction is an important and worthy research technology in food processing processes and the results obtained as a result of scientific and technological studies in this field are considered to be potential to be turned into high value-added products.

**Keywords:** Food processing, heat treatment, induction

## CHARACTERIZATION OF CARDAN SHAFT FLANGE PRODUCED BY HOT FORGING

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### Abstract

The cardan shaft with a driveline; transmits the torque or torque generated in the gearbox to the differential and is expected to have significant performance criteria such as under load and fatigue. Our company, which operates in the automotive supply industry sector, has a R & D center; Metallographic and mechanical characterization studies of the cardan shaft flange were carried out. The mechanical properties of these flange parts, which are produced by the hot die forging method using the raw material with different chemical compositions, vary depending on the production conditions, chemical composition and cooling conditions. These factors affect the cardan shaft fatigue performance. In this study, phase variation, distribution and size and hardness changes were investigated by taking samples from raw materials and forged products.

**Keywords:** Cardan Shaft, Mechanical Properties, Vickers Hardness, Microstructure

## A NEW GENERATION NANOTHERAPEUTIC: EFFICIENCY OF pHEMA-CHITOSAN NANOSPHERES IN siRNA DELIVERY

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### Abstract

Due to barriers such as cell membrane, presence of endonucleases and immune response, gene therapy studies using nucleic acids has not yet been achieved to desired success. In last decade, efforts on gene transfection using nanoparticles attracts great interest to improve efficiency of these therapeutic molecules. In current study, poly(2-hydroxyethyl methacrylate) pHEMA core encapsulated with siRNA molecule (GsiR) silencing green fluorescence protein (GFP) was coated with cationic chitosan shell to synthesise pHEMA-chitosan nanospheres (PCNSs) as a new generation transfection vehicle.

The charge, dispersion and size of nanoparticles were characterized using zeta potential value measurements, dynamic light scattering (DLS) and scanning electron microscope (SEM) analyses. To test transfection efficiency of PCNS-GsiR nanospheres, the synthesized PCNS-GsiR complexes were applied in COS-7 cells and the findings were evaluated comparing with a commercial transfection reagent.

The surface charge of both PCNSs (+39,5) and PCNSs-GsiR (+40,2) was measured positively, which is probably due to the cationic chitosan shell. According to the DLS results, encapsulation of GsiR increased the size of PCNSs from 111,2 nm to 133,5 nm. Similarly to commercial transfection reagent, PCNSs mediated GsiR transfection reduced GFP expression 45 %. In a conclusion, PCNSs is determined as a promising vehicle for therapeutic siRNA delivery.

**Keywords:** pHEMA-Chitosan nanospheres, gene therapy, siRNA, GFP silencing

## RESEARCH ASSISTANT SCHEDULING TO LABORATORY COURSES USING BINARY INTEGER PROGRAMMING

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### Abstract

In this study, the aim is to make research assistant assignments to Food Engineering Department laboratory applications using a binary integer programming model. In the current operation, this assignment is done manually in the Food Engineering Department. This is a problem faced at the beginning of each semester and takes time for each schedule. The computerized schedule is compared with the manual schedule and it is found to be compatible. In addition, the computerized schedule provides much faster solutions, which saves time for the decision makers of the system.

**Keywords:** Binary Integer Programming, Laboratory course schedule, Assignment problem.



## A FINANCIAL INNOVATION CRYPTOCURRENCY AND THE MOST VALUABLE CRYPTOCURRENCY TYPES

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### Abstract

The unpredictable progress of the technology has globally affected not only the financial structures of all countries but also the financial markets, and changed the tools used here. Also, technological developments have caused the digitalization of traditional financial instruments. Particularly, the market values of virtual currencies have increased dramatically depending on increased interest in cryptocurrency. Cryptocurrencies are currencies that use cryptography (encryption). Cryptology process makes the transactions more secure and take under control the creation of new cryptocurrencies. Digital currency have the ability to keep a public account record away from the control mechanism. Although Bitcoin has the best performance in terms of value increase, over the last few years, cryptocurrencies such as Litecoin, Peercoin, Dogecoin, Auroracoin and Ripple have emerged. In this study, it was explained the definition of cryptocurrency which is an example of financial innovation and entrepreneurship and what it was and how it emerged. Also, it was detailed commonly used cryptocurrencies.

**Keywords:** Cryptocurrencies, Bitcoin, Altcoins

## THE EFFECT OF BORIC ACID AND ZINC OXIDE ADMIXTURES ON ANTIBACTERIAL PROPERTIES IN CERAMIC GLAZES

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### Abstract

Our country ranks 8th in the world in the production of ceramic tiles, and exports rank 4th in the world. In an increasingly competitive stage, research, development of technology, and innovation requirements are increasing[1]. In this research, it aimed that to produce antibacterial, hygienic and economic glazes for ceramic structures and to characterize them.

In certain proportion's boric acid and zinc oxide was added to the glazes which were obtained from Serel Seramik Inc. And then applied on the surface of biscuit cakes. The microstructure analyses were performed by using scanning electron microscopy (SEM) and X-ray diffraction (XRD) devices. And strength tests were performed by using Shimadzu AG-I the three-point bending device. Antibacterial properties of ceramic tiles were investigated by planting *Staphylococcus aureus* (S. a.), *Escherichia coli* (E.c) and *Bacillus subtilis* (B.s).

The optimum sintering temperature is 1080°C. The results of SEM and XRD analyses showed that the glaze layer had homogeneous distribution and did not undergo a structural change. Tiles coated with glazes which contain 5% zinc oxide and 5 % boric acid, were sintered at the lower sintering temperature than glazes which contain no additives. And they also gave better compressive strength results. At the same time, tiles coated with glaze exhibited antibacterial properties.

**Keywords:** Antibacterial, glaze, ceramic, characterization

## RELIABILITY ANALYSES IN STEEL PRODUCTION AND ROLLING SECTORS

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### Abstract

In the scope of this study, reliability concept in steel manufacturing sector is discussed. The reliability analysis of mechanical properties of the produced materials and the equipments in the production process were explained. The requirements of the reliability analysis are explained and discussed.

**Keywords:** Reliability, Steel Production, Rolling Equipment.

## THE REVIEW OF RECENT DEVELOPMENTS IN UNDERGROUND COAL MINING

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### Abstract

Underground mining is an important production method for the production of coal and metal mines. Nowadays, keeping the work safety at the forefront, with the technology developing in the underground mines, larger production is made with lower costs. The fact that the machine technology was highly developed in the period of the Industry 4.0 has enabled the production to be made more safe and large amounts. In the study, the developments in underground mining in recent years have been explained underground, especially with the production, support, transportation, ventilation and work safety headings. As a result, in our country, these developments that occur in the mechanization for a fast, efficient and safe coal production should be closely monitored and should be expanded for underground coal mines without losing time.

**Keywords:** Recent developments, Underground coal mines, Work safety



## THE TYPES OF BENTHIC MACROPHYTE COMMUNITIES IN THE MEDITERRANEAN COASTS OF TURKEY

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### Abstract

The types of species and communities are affected by habitat types (rocky, sandy, mud, sandy mud). In the present study, The types of benthic macrophyte communities in the Mediterranean coasts of Turkey was studied. Six types of benthic macrophyte communities were classified in the eastern Mediterranean coasts: sensitive perennial algae on the rocky coast habitats, coralligenous red algae, seagrasses on the sandy habitats, sensitive perennial algae on the rocky sandy habitats in the deep water, maerl on the sandy mud habitats and non-indigenous species (NIS) on the sandy rocky habitats.

**Keywords:** Macrophyte communities, Mediterranean Sea, Turkey.

### Acknowledgements

This study, a part of the project called “Integrated Pollution Monitoring in Seas supported by the Ministry of Environment and Urbanization and TÜBİTAK MAM, and Ministry of Food Agriculture and Live Stock by TAGEM (Project No: TAGEM/HSGYAD/15/A11/P03/66)

## NON-INDIGENOUS MARINE MACROFLORA IN THE MEDITERRANEAN COASTS OF TURKEY

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### Abstract

A list of accepted alien and invasive marine macrophytes occurring on the coasts of Turkey is presented. The list consist of 13 Rhodophyta (Red algae), 13 Phaeophyceae (Brown Algae), 6 Chlorophyta (Green algae) and 1 Magnoliophyta for a total of 33 taxa at specific and infraspecific level. Data concerning geographical and Mediterranean distributions and the possible vector of introduction of each species are also given.

**Keywords:** Alien species, invasive species, marine algae, Turkey.

### Acknowledgements

This study, a part of the project called “Integrated Pollution Monitoring in Seas” supported by the Ministry of Environment and Urbanization and TÜBİTAK MAM, and a part of supported by Manisa Celal Bayar University BAP (2015-47).

## A HYBRID NUMERICAL METHOD BASED ON DICKSON POLYNOMIALS FOR SOLVING SOME FRACTIONAL MODEL DIFFERENTIAL EQUATIONS

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### Abstract

In this study, we deal with some fractional model differential equations by employing a hybrid matrix-collocation method based on the Dickson polynomials with the parameter- $\alpha$ . These considered equations are mostly arisen in modelling science and engineering problems. The proposed method presents a novel hybrid structure including the Dickson polynomials and an integration of fractional derivative with a matrix system. This well-posed methodology enables us to clearly obtain the approximate solutions of the problems. By taking into account different value of  $\alpha$ , we scrutinize the physical behavior of the solutions and their numerical results in figures and tables. We can thus observe the precision of the method for different problems. We eventually conclude from all results that the proposed method is incentive, accurate and reliable.

**Keywords:** Collocation points, Dickson polynomials, Fractional differential equations, Matrix method



## INVESTIGATION OF THE EFFECT OF GEARS PRODUCED BY POWDER METALLURGY ON THE GEAR STRENGTH OF PRODUCTION PARAMETERS

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### Abstract

In this study, the spur gear wheel will be produced; After determining the number of modules and teeth, profile shifts were applied to the gears to improve the strength characteristics. Metal powders (98% iron, 0.5% MnS, 0.6% carbon, 0.6% Kenolube) were used for powder metal gear production. After the calculations, the compression molds of the spur gear are designed and manufactured. Pressing (compression) was applied at different pressure values. Sintering was done in 900-1350 °C temperature ranges. Some of the samples were air-cooled and the other part was water-cooled. SEM images of the samples cut in wire erosion were taken and hardness values were measured. The densities of all samples were calculated. The use of a single acting press in the compression step reduces the density of the sintered gear wheel to 6.5 g/cm<sup>3</sup>; It was observed that the density of the gears compressed at low pressure was low and the surface ruptures occurred at low pressures. The density values of the sintered gears produced were determined in the range of 6.5-7.3 gr/cm<sup>3</sup>. To achieve this density value; compression degree, compression method, sintering temperature and method were found to be effective in cooling rate.

**Keywords:** Plain gear design, Pressing, Sintering, Powder metallurgy

## MODIFICATION OF THE DIALDEHYDE CELLULOSE WITH PLA AND PEG

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### Abstract

The polymer industry occupies a growing area in our daily life, among which most uses involve a relatively short lifetime. Therefore, solving the problem of plastic accumulation in the environment involves the use of biodegradable polymers (Qu, et al., 2001). Cellulose is one of the most abundant natural polymers on Earth. Recently, researchers have shown a growing interest in cellulose research due to its biodegradability, including biocompatibility, chemical and reactive surface properties (Liu, et al. 2018).

In our study, micro-cellulose was used, and the oxidation reaction was carried out with NaIO<sub>4</sub>. As a result of this reaction, 2,3-dialdehyde cellulose was obtained, and different modifications were made with this DAC obtained by PLA (polylactic acid) and PEG (polyethylene glycol). These structures formed were examined by thermogravimetry (TG), differential thermogravimetry (DTG) and infrared spectroscopy (IR) techniques.

**Keywords:** Cellulose, PLA, PEG, DAC, DAC modification

## NUMERICAL SOLUTION BASED ON STIRLING POLYNOMIALS FOR SOLVING GENERALIZED LINEAR INTEGRO-DIFFERENTIAL EQUATIONS WITH MIXED FUNCTIONAL ARGUMENTS

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### Abstract

In this research, a new operational matrix method based on the Stirling polynomials is developed to solve for high-order generalized linear Volterra-Fredholm integro-differential equations with mixed functional arguments. This method transforms the integral equations to a system of a linear algebraic equations via collocation points. The coefficient matrix of the system obtained in terms of Stirling polynomials. Besides, to demonstrate the validity and applicability of the new method, some numerical examples with error analysis are given and the obtained results are compared with the existing results in literature. Furthermore, the numerical results illustrated in tables and figures are compared. Also, error analysis is given to confirm the trueness of method. In conclusion, the results show that the suggested method was successfully solved a problem of generalized linear integro-differential equations and presented better numerical approximation than the other polynomials.

**Keywords:** Stirling polynomials, Stirling series, matrix method, collocation points, residual error estimation, functional integro differential equations.

## FLAME RETARDANT EFFECT OF BORAX ON COTTON FABRICS BY SOL-GEL METHOD

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### Abstract

In this study, borax flame retardant properties of cotton fabric by sol-gel method were investigated. The boron compound was applied to fabrics using a variety of sol-gel method combinations. LOI was compared with cotton fabric treated with spectrophotometer, reference fabric and commercial flame retardant product. As a result, the flame retardant sol-gel system containing Silica Boron (S-B) was found to be as successful as the commercial product in the combustion test. The treated fabrics showed color differences according to the reference fabric.

**Keywords:** Textile, Cotton, Borax, Flame retardancy, Sol-gel

## DESIGN AND IMPLEMENTATION OF A LOW COST REFRESHABLE BRAILLE DISPLAY USING OPEN HARDWARE

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### Abstract

Refreshable Braille Display is a device with a tactile interface that enables people with blindness to access digital content. The high cost of these devices restricts their usage to affluent individuals and organizations and as a result, restricts their penetration in developing nations. In this work, a refreshable braille display was developed using open source hardware and software to build a low-cost device for visually impaired students. The system consists of one coordinator block and addable letter blocks, which are identical in terms of hardware but assigned during the construction of the device. Each block has a microcontroller, namely ESP8266, and six servo motors. Each servo motor controls one dot in a Braille Letter. The device displays the text letter by letter by refreshing the positions of the servo motors. The coordinator block, which is also an ESP8266 microcontroller, reads the text to display from a storage medium or from a web URL. The coordinator block is responsible to synchronize the letter blocks. The capacity of the device can be increased by adding extra displays.

**Keywords:** Refreshable braille display, microcontroller, servo motor

## INNOVATION STRATEGIES OF SMEs, FACTORS AFFECTING THE INNOVATIONS AND, PRACTICE EXAMPLES IN TURKEY

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### Abstract

Technology develops rapidly in the global competition conditions. As a result of technological developments, customer demands also alter. In this situation, businesses that want to maintain their assets need to meet new demands. Therefore, businesses are faced with the necessity of producing new products and services. The importance of the concept of innovation is further strengthened with increasing competition at this point. Businesses have begun to be more interested in innovation because they cannot survive with traditional products and services in a global competitive environment. Today, the innovation race has started among businesses. The fact that capital structures are quite strong has increased the investment of innovation in large businesses but they cannot respond quickly to changes due to their bulky structure. Because of their flexibility, SMEs are more successful in innovation than large businesses. In this study, as depending on SMEs and innovation concept innovation strategies of SMEs were mentioned later, it was mentioned which the factors affecting innovation in SMEs. In the last part of the study, examples of innovation practice in SMEs found in Turkey were given.

**Keywords:** SME, Innovation Strategies



## DETERMINATION OF SOME QUALITY PROPERTIES WITH PHENOLIC AND ANTHOCYANIN CONTENT OF PLUM JAM OBTAINED USING DIFFERENT PROCESSING METHODS

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### Abstract

Fruit and vegetable processing industry, high rate of water containing and easily deteriorating agricultural products wants to make it durable after harvest. One of the processes for this purpose is jam production. In this study, some quality characteristics of the plum jam, which are prepared by using two different methods, are determined. In order to determine the effect of methods used to prepare plum jam pH, color, Brix, acidity values, phenolics, anthocyanin and HMF content were determined. While the duration of jam making with microwave was shortened, no significant change in color, pH and titratable acidity was observed. Phenolic and anthocyanin content was found to be increased. This study showed the applicability of microwave processing technique in jam making.

**Keywords:** Traditional Processing, Microwave, Plum Jam, Phenolic, Anthocyanin, HMF

## DESIGN OF FIREPROOF COMPOSIT BACKING WITH ADDED POWDER BISMUTH

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### Abstract

It was aimed to provide a design of fireproof composite backing, design of which was planned, different from conventional weld backings. It shall be shaped in the form of fireproof fiber composite structure. Powder bismuth element shall be added at certain percentages to its content. The mentioned element, a diamagnetic material, shall develop arc stability during weld. The present design optimized with diamagnetic physical properties shall investigate both positive effect to weld penetration and effect of minimum heat transfer to HAZ (Heat affected zone).

**Keywords:** Weldability, Weld Backing, Diamagnetic, Penetration, Heat affected zone.

## ZnO ADDITIVE POLYETHYLENE NANOCOMPOSITES

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### Abstract

Polyethylene is the most widely used thermoplastic material and is composed of ethylene. The two main types are Low density polyethylene (LDPE) and high-density polyethylene (HDPE). Polyethylene (PE) is an extensively used plastic material because of its valuable properties, due to its light weight, low cost, flexibility, toughness, good mechanical properties and resistance to chemicals and harsh environments, good dielectric properties, electrical insulation.

In this study, the effect different weight of low density polyethylene with ZnO nanocomposite was investigated. These nanocomposites in melt flow rates, mechanical tests (tensile strength at yield, tensile strength at break, elongation at break), thermal analysis (DSC and TG) of the prepared mixtures were examined.

**Keywords:** Polyethylene, Composite, ZnO, thermal analysis, mechanical properties.

## SOLUTIONS FOR HIGHER ORDER DELAY LINEAR FREDHOLM-VOLTERRA INTEGRO-DIFFERENTIAL EQUATIONS USING MORGAN-VOYCE POLYNOMIALS

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### Abstract

In this work, the matrix method that was proposed in [1] is generalized for solving a class of higher order linear functional Fredholm-Volterra integro-differential equations by giving also the matrix relations of corresponding functional forms of higher order derivatives as well as functional forms of the integro-differential terms. The proposed method gives the approximate solutions of mentioned class that are constructed by using Morgan-Voyce polynomials as the coefficients of series form of solution. Extended abstract should consist of abstract, introduction, conclusions and references sections as follows.

**Keywords:** Morgan-Voyce Polynomials, Matrix Method, Delay Fredholm-Volterra Integro-Differential Equations.

## GEGENBAUER MATRIX METHOD FOR SOLVING HIGH-ORDER FUNCTIONAL DIFFERENTIAL EQUATIONS WITH HYBRID DELAYS

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### Abstract

In this study, the Gegenbauer matrix-collocation method has been presented to solve high-order linear functional differential equations with hybrid delays under mixed conditions. This method is based on the matrix forms of Gegenbauer polynomials and their derivatives together with the collocation points. The used technique reduces the problem to a matrix equation corresponding to a set of algebraic equations with the unknown Gegenbauer coefficients. Also, an error analysis based on the mean value of residual function is performed and some numerical examples are given to clarify the efficiency and accuracy of the method.

**Keywords:** Gegenbauer polynomials; Collocation method; Functional differential equations; Residual error analysis; Matrix method.

## A DECISION SUPPORT SYSTEM FOR DYNAMIC SCHEDULING OF MULTI-AISLE AUTOMATED STORAGE AND RETRIEVAL SYSTEMS

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### Abstract

Automated Storage and retrieval systems are warehousing systems that performs the repetitive tasks of storing and retrieving operations under a defined degree of automation. These systems represent high investment and operating costs. Hence, it is important to maximize the system performance to increase the return of the investment. AS/RS performance depends on several factors such as AS/RS design, storage assignment policy, scheduling of storage and retrieval machine etc. The scheduling of storage and retrieval machines in AS/RS is generally studied in a static and deterministic way in the current literature whereas it is, by nature, multi-objective and is subject to a wide range of uncertainties such as machine breakdowns, arrival of high priority jobs, demand changes etc. The aim of this study is to develop a decision support system for dynamic scheduling of multi- aisle AS/RS systems. The proposed decision support system is based on the combined concepts of simulation, fuzzy logic and VIKOR. The results of the experimental studies showed that the proposed decision support system can be well used for scheduling of AS/RS in a dynamic manner.

**Keywords:** Automated storage, simulation, decision support systems, fuzzy logic

## FOOD SAFETY SYSTEM WITH BLOCKCHAIN TECHNOLOGY

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### Abstract

The study aims to combine the traceability and documentation of food safety systems with the blockchain technology. Using this technology in food safety systems enables a transparent, backward-changeable system until the consumer reaches the first production stage.

**Keywords:** Blockchain, Food Safety, Traceability

## MATHEMATICAL MODELLING OF TOWER CRANES

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### Abstract

In this study, analysis of displacements and vibrations versus the applied loads of tower cranes are considered by means of finite element method. Beam elements, which are consisted of tower cranes, are used for the formulation of the finite element method to obtain the results; and SAP2000 program is used as computer programming language. The displacements of the nodal points and the stresses of the beam elements are calculated for applied loads and other forces such as wind effects, the effects of the vibrations on the tower crane structure and for any displacements versus the applied forces on the nodal points of the structure and natural frequencies related to determinated nodes are determined. As a result, the supposed wind effects are low effective and the applied loads and vibrations are more effective on the tower crane structures are obtained.

**Keywords:** Tower Crane, Mathematical Modelling, Vibration Analysis, Stress Analysis

## BOUBAKER POLYNOMIAL APPROACH FOR NEUTRAL DIFFERENTIAL EQUATIONS WITH FORCING TERM AND VARIABLE DELAY

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### Abstract

The main aim of this study is to apply the Boubaker polynomials for the approximate solution of neutral type differential equations with forcing term under the initial condition. The technique we have used is essentially based on the truncated Boubaker series and its matrix relations along with collocation points. Also by using the method related with residual function, some numerical examples together with error estimation are given to clarify the efficiency of the method. All of the numerical computations have been performed on tech computer using a program written in MATLAB (R2014b). We show the obtained numerical results with figures and tables.

**Keywords:** Boubaker polynomials and series, Neutral differential equations, Residual error, Matrix-collocation method.

## A COMPARATIVE STUDY OF TS 648 AND TSSC 2018 IN TERMS OF TENSILE AND COMPRESSIVE STRENGTH

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### Abstract

This study emphasizes similarities as well as differences between Turkish Building Code for Steel Structures 1980 (TS 648) and Turkish Specification for Design, Calculation and Construction of Steel Structures 2018 (TSSC 2018) by taking into account only tensile and compressive strength. Pursuant to this purpose, steel members having different connection details under pure tensile load and steel members having different width to thickness ratio under pure compression load are evaluated respectively. Analytical results reveal that, tensile members where all cross-sectional parts are connected the connection gusset plates have same tensile strength since yielding in the gross section governs. However, in those members where at least one of the cross-sectional parts is not connected the connection gusset plates, block shear is more pronounced than other failure modes; therefore, TSSC 2018 gives lower strength due to the fact that TS 648 does not take into consideration block shear failure. On the other hand, compression members without slender cross-sectional parts have nearly same compression strength capacity for both specifications whereas in those with slender cross-sectional parts, since TS 648 does not carry about local effects, TSSC 2018 gives lower strength.

**Keywords:** TS 648, TSSC 2018, tensile, compressive, steel.

## UNEXPECTED BEHAVIOR OF CONSTANT CORE BUCKLING-RESTRAINED BRACES UNDER SUBASSEMBLAGE TESTING

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### Abstract

Buckling-restrained braced frames (BRBFs) indicating high elastic stiffness and high ductility behavior are among lateral force resisting systems. A typical buckling-restrained brace (BRB) is composed of core plates, debonding material and encasing members. Core plates of the BRBs are one of the most significant members that influence axial load capacity. Reduced plate, constant plate, perforated plate and welded overlap plate are geometrical alternatives of the core plates. BRBs need to provide requirement of qualifying cyclic tests to be performed on a subassembly and a uniaxial test specimen. In this study, three specimens employing constant core steel encased buckling-restrained brace exhibiting sufficient performance under uniaxial test before were re-evaluated under subassembly test. The loading protocol defined in American Institute of Steel Construction Seismic Provisions for Structural Steel Buildings (AISC 341-16) was applied with minor changes. According to test results, owing to poor detailing, these braces develop unacceptably high compression and tension resistances. Hence, the behaviors of these BRBs under uniaxial testing and subassembly testing are markedly different.

**Keywords:** Steel, buckling-restrained braced frame, subassembly test.



## HOT FORGING PROCESS SIMULATION OF CARDAN SHAFT FLANGE

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### Abstract

Forging process is one of the popular methods in metal forming. Many of the industrial parts are produced by this method because of its high strength and production rate of parts. Parameters such as temperature, geometry of raw material and die are effective in reducing production cost and increasing part quality. If the design and manufacturing of parts without simulation are on basis of experience that results in time waste and high cost. The prediction of material flow can be achieved completely by computer simulation. Main parameters in computer simulation are filling the die completely without leaving any defect, reducing material loss and stress in die and increasing die life. In order to reduce the cost of forging process and make it competent with other production methods, it is essential to optimize the design of part and die. Moreover, considering required forces, energy and time in such a way to attain an accurate analysis and design could be highly important. Therefore, using of the accurate computer simulation can be an effective method for reaching these goals. Forging of complex parts is usually performed in several steps. Design of step numbers, step types and intermediate steps (pre-forms) along with the design of final die, forging parameters and process conditions are the most complex tasks in forging simulation. Generally, application of computer to design the required steps based on analytical and experimental data has been considered excessively by other researches previously. In this study; Simulation supported production activities and analyzes of the cardan shaft flange were carried out. According to the results; The temperature, the rate of deformation and the quality of the material affect the amount of load and material flow required during shaping.

**Keywords:** Hot forging, simulation, proses design and manufacturing.

## WATER EFFICIENCY LABELLING

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### Abstract

Environmental concerns are of greater importance than ever before. Like water, land and air pollution, water scarcity is much-spelled due to the additional stress provided by climatic change. Eco-labelling is one of the devices developed for the application of environmental policies in major countries of the world. Western European countries come first in this respect. Eco-labels are envisaged to be the important means that may affect consumers' purchasing decisions. What is aimed here is to encourage customers towards selecting environmentally-friendly goods. Water efficiency labelling has been on application in some countries as a mean for their water efficiency programs (Oflač & Göçer, 2015). In this study, the progress of water efficiency labeling in the world is investigated and prospects are made for Turkey.

**Keywords:** Water efficiency labelling, water scarcity, household appliances

## OPTIMIZATION OF NICKEL DISSOLUTION FROM LATERITIC ORE IN SULFURIC ACID SOLUTION AT ATMOSPHERIC PRESSURE BY TAGUCHI METHOD

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### Abstract

In this study The Taguchi Fractional Design Method was used to determine the optimum conditions for the dissolution of lateritic ore obtained Meta Nickel Company (Gördes - Manisa) in sulfuric acid solution at atmospheric pressure. Temperature, leaching time, solid to liquid ratio, sulfuric acid concentration and stirring speed were chosen as parameters. The optimum conditions for dissolution were found as a temperature of 95°C, leaching time of 150 min, solid to liquid ratio of 20 g. ore /100 mL solution, sulfuric acid concentration of 65 % (w/v) and without stirring. The experimental results under optimum leaching conditions, showed that the extraction of nickel from lateritic ore was 90 % approximately. Analysis of variance (ANOVA) was applied to experimental results. Percentage contributions of each factor for the dissolution of nickel were determined.

**Keywords:** Dissolution, Lateritic ore, Nickel, Sulfuric acid; Taguchi method.

## THE CHANGING PARAMETERS OF THE INDUSTRY IN TURKEY: AN ANALYSIS ON UNIVERSITY-INDUSTRY COLLABORATION PROJECTS

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### Abstract

Universities are affected by the changes in the social, economic and social spheres with globalization and they are restructure their fields of study, research and contents accordingly. The priorities of countries, universities and industry bring different cooperation models regarding research on social dynamics, economic conditions and demands and, government policy related innovation. Also in Turkey since the 2000s, university-industry collaboration activities form the basis of the national innovation system which had been implemented by universities, like all institutions, in which industrial design departments were also the main actors. Cooperation with stakeholder companies is an important aspect at undergraduate level industrial design studio education for graduation projects. The senior year graduation projects in an Industrial Design department are structured as Industry Joint Graduation Project within the framework of University-Industry cooperation projects for 14 years. Graduation projects produced between 2011-2018 indicate the changes in the sector and the existence of the investors for these changing areas. While, in the past years there has been an emphasis on traditional housewares, recently new areas emerged due to new production methods, demands of the society and government policies.

**Keywords:** University-industry cooperation, graduation projects, industrial design education



## SOME INEQUALITIES FOR N-TIMES DIFFERENTIABLE LOG-CONVEX AND S-LOG-CONVEX FUNCTIONS

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### Abstract

We present some inequalities for  $n$ -times differentiable functions. These inequalities are associated with the perturbed trapezoid inequality. In this study,  $n$  th derivatives of absolute values of the considered functions are *log – convex* and *s – logarithmically convex*. Finally, some applications are given to verify the suggested inequalities.

**Keywords:** Convex function, log-convex, s-logarithmically convex, perturbed trapezoid inequalities

## COATING OF POLYMER SURFACES WITH PHOSPHORESCENCE INORGANIC COMPOUND ADDITIVES

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### Abstract

The phosphors, which continue to emit light after being excited, have a wide range of use in the dials, luminescent paints, traffic signs, emergency signals, textile, accessory materials, LED (Light Emitting Diode) and plasma display panels. For this purpose, the production methods of the phosphorescent pigment doped polymer surfaces and the homogeneous distribution of the pigment in the polymer media are important. In addition, the resulting surface must be transparent to absorb the incoming light. Proper production methods for the use of phosphorescence pigments on opaque surfaces such as urea formaldehyde must be developed.

In this study, the mixture obtained by mixing the commercially available phosphorescence  $\text{Eu}^{2+}$  and  $\text{Dy}^{3+}$  doped strontium aluminate derivatives and different transparent thermoset or thermoplastic polymers were applied to the opaque urea formaldehyde polymer surface. For characterization of strontium aluminate derivatives, particle size analysis, XRD, ICP-MS techniques were used. After curing or drying of the polymer applied to the surface, emission-excitation and phosphorescence measurements of the pigment on the surface were carried out. In addition, adhesion and water sorption tests were performed in the final sample.

**Keywords:** Phosphorescence, Strontium aluminate, Pigment doped polymer media

### Acknowledgment

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## COMPARISON OF THE NEW TURKEY BUILDING EARTHQUAKE CODE 2019 AND TURKISH SEISMIC CODE 2007

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### Abstract

In this study, improvement, development and new technologies in new Turkish Seismic Code according to Turkish Seismic Code 2007 are presented in detail. The reasons for entry into force of the Turkey Building Earthquake Code-2019 are investigated. In addition, a simple reinforced concrete structure is modeled as 2, 4, 6 and 8 stories and the comparison of natural periods and base shear forces are made by using equivalent earthquake load method in both codes. Finally, it is observed that natural periods obtained with new seismic code are higher than that of Turkish Seismic Code 2007.

**Keywords:** Seismic analysis, Turkey Building Earthquake Code, Turkish Seismic Code

## DISPLACEMENT BEHAVIOURS OF R/C STRUCTURES ACCORDING TO 2007 AND 2019 TURKISH SEISMIC CODES

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### Abstract

In this study, the effect of plan irregularities on the displacement performances of R/C structures are investigated according to 2007 and 2019 Turkish Seismic Codes by a parametric method. The parametric variables are different shear wall locations and geometric plans, story numbers and local soil classes. Equivalent Seismic Load Method is used for seismic analysis and structures are modeled by using SAP2000 program. Multi-story shear wall-frame systems are analyzed according to the 2007 and 2019 Turkish Seismic Codes and the displacement results of the structures are compared.

**Keywords:** Displacement, Irregularity, Local site class, Seismic analysis, Turkish Seismic Code

## APPLICATIONS OF PIEZOELECTRIC BEAMS

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### Abstract

In this study a short literature review of piezoelectric beam is presented. Applications of piezoelectric beams are widely used in a number of engineering areas such as mechanical engineering, civil engineering, bio engineering, and aerospace engineering. Firstly, brief information about piezoelectric materials is given by following the applications of piezoelectric beams.

**Keywords:** Beam, Piezoelectric material,

## DYNAMICS OF VISCOELASTIC EULER-BERNOULLI BEAM WITH FUNCTIONALLY GRADED MATERIAL

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### Abstract

The aim of this study is to give information about properties of the functionally graded materials (FGM) and applications of FGM beams for universities and industries. Free vibration analysis has been done by obtaining FGM viscoelastic Euler-Bernoulli beam model. Due to large application areas, mechanical behaviors of FGM viscoelastic Euler-Bernoulli beams are defined. For this, firstly, the equation of motion of the problem is derived and then the equation is solved to analyze free vibration characteristics such as natural frequencies, mod shapes, times histories. Also, the static deflection of the beam is calculated. All outcomes are presented in graphs.

**Keywords:** Euler-Bernoulli beam, Viscoelastic model, Functionally graded beam,

## B. POSTER PRESENTATION

### ALTERNATIVE NATURAL RAW MATERIAL STUDIES REPLACING TITANIUM DIOXIDE IN COATING TECHNOLOGY IN DRAGEE CONFECTIONERY

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#### Abstract

Titanium dioxide (TiO<sub>2</sub>) is a white mineral that is found naturally on earth. This mineral is processed and refined to make it suitable for consumption. This substance is widely used in industry to turn the color of foods, increase the brightness and improve the physical appearance of the final product.

This additive has physical and chemical advantages to the product it is used. However, the negative aspects of human health as a result of the consumption of the product are discussed by scientists. Declaration of titanium dioxide as a food additive and bleaching dye (E171) in the food content lists led to a decrease in sales and bias towards the product in consumers. At the same time, direct inhalation of titanium dioxide powder by air is classified by the International Agency for Research on Cancer (IARC) as being carcinogenic. Features are known to lead to long-term health problems for the use of food and the level of use dosage is 1%. As Durukan Confectionery Inc., with this project, we aimed to adapt to our coating technology by developing an alternative, healthy, natural food raw material to our existing titanium dioxide additive.

In this direction, we searched for alternative raw materials and examined their applicability in our technology and product groups. Experiments of the raw materials supplied were studied and their effects on the end product were studied. As a result of the studies carried out; observations about the final product, shelf life studies and results of consumer appreciation tests have been completed successfully. As an outlet, it has been seen that we can change the coating material from Titanium Dioxide to natural raw materials as in all of our product portfolio. Through the study, best fitting raw material for the coating, will be determined via Response Surface Methodology. Final product quality parameters will be texture and color analysis (Hunter Lab Analysis).

**Keywords:** Titanium Dioxide, Coating Technology, Confectionery, Response Surface Methodology

## DEVELOPMENT OF PUFFY TEXTURED DRY FRUIT SLICES DRYING PROCESS WITH MICROWAVE VACUUM DRYING TECHNOLOGY

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### Abstract

Dried fruits are widely used as components in many formulations of foods such as cakes, confectionery products, ice cream, breakfast cereals, healthy snacks, frozen desserts and yogurt. Innovative drying technologies are highly important for modern plants that produce hygienic foods, which can be sustained production of high quality and value-added dried products. Vacuum microwave drying is a quite new technology for drying fruits in industrial scale. In this study, it is aimed to determine drying process parameters in order to obtain natural and high quality end product which can be preserved at the highest level of taste, smell, color, aroma and structure of the fruits by using pilot-scale microwave vacuum drying system. In this project Banana, strawberry and apple were sliced to different thickness by pilot scale slicer and dried by pilot microwave vacuum drying system. It is aimed to determine the optimum sliced thickness of fruits, microwave power and drying time for optimize the drying process of bananas, strawberries and apples. As a result, Products which has a thickness of between 5 and 8 mm and a moisture content of less than 8% were obtained with puffy texture.

**Keywords:** Vacuum microwave, Puffy texture, Fruit slices.

## EFFECT OF SILVER NANOPARTICLES ON THE SPECTRAL PROPERTIES OF RUTHENIUM COMPLEXES

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### Abstract

Ruthenium complexes are known as organometallic compounds that are optically functional. These complexes are widely used in many areas such as light emitting diodes, electroluminescence devices, dye sensitive solar cells and oxygen sensitive optical sensor applications. In current studies, it has been regarded that conductive noble nano-sized metals such as gold and silver enhance the optical properties of such complexes, and that strong plasmon resonance property increases luminescence intensity. Silver is the most commonly used metal to develop fluorescence due to its low cost compared to gold. In this study, we investigated effect of silver nanoparticles on the spectral properties of newly synthesized ruthenium-based organometallic complexes. We anticipate that silver nanoparticles will give advantageous properties over the spectral properties of Ru complexes and can be used in many optical fields.

**Keywords:** ruthenium, organometallic compound, silver, nanoparticles, luminescence, spectral properties

## NOVEL THIOSEMICARBAZONE LIGAND AND ITS RUTHENIUM (II) COMPLEX: SYNTHESIS, CHARACTERIZATION AND ANTITUMOR STUDIES

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### Abstract

Looking for new metal-based anticancer treatments, in recent years many ruthenium complexes have been proposed as effective and safe potential drugs. Many ruthenium compounds contain exchangeable ligands, bearing heteroatoms such as nitrogen, sulfur and oxygen which are capable of chelating with a broad range of metal ions to form stable organometallics, and require activation by the tumor microenvironment. Recently, thiosemicarbazones (TSCs) have attracted impressive attention for their broad spectrum of bioactivities. The biological importance of both TSC ligands and the ruthenium has prompted us to develop promising ruthenium complexes as therapeutic agents and to explore the biological applications of these complexes.

**Keywords:** Ruthenium, thiosemicarbazones, cancer-targeted drug, cell cycle, apoptosis.

## INVESTIGATION OF THE FERMENTATION ACTIVITY OF DIFFERENT COMMERCIAL YEASTS ON DOUGH DEVELOPMENT IN BAKERY INDUSTRY

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### Abstract

In this study, it was aimed to determine the effects of commercial yeasts in different forms on rheological properties of dough and bread quality. Types of yeasts are; compressed yeast, liquid yeast, crumbled yeast, active dry yeast and instant active dry yeast.

**Keywords:** *Saccharomyces cerevisiae*, Compressed yeast, Fermentation activity, Dough development.

## BUILDING AGRICULTURAL OPEN INNOVATION ECOSYSTEMS; LESSONS FROM THE PAST AND FUTURE PERSPECTIVES

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### Abstract

The production system and farming strategies of different types of cultivators should be considered in development of varietal research in plant breeding programs. In the light of this thesis, this paper provides an analysis of a systematization on life cycle processes involved in agricultural open innovation ecosystems with participatory, problem-oriented approaches. In this concept; the general review of knowledge and the factors that influence the creation of such ecosystems are described. The highlights of this concept are analysis of problem, examination of infrastructure, building field trials, and analysis of results. Participatory research tends to focus especially on small numbers of farmers. But this small numbers of farmers can be a sample of the common farmers which has the same problems waiting to be solved. Also it is useful for researchers with low budget projects. The labor force for the experiments can be handled by farmers. We suggest that participatory approaches can be integrated into the work programs of national agricultural research services to develop breeding programs and other agricultural innovations.

**Keywords:** Open Innovation, Ecosystems, Plant breeding, Farmer participation, Problem-oriented approach.

## ENGOGLAZE DEVELOPMENT FOR THE PRODUCTION OF GLAZED PORCELAIN TILES

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### Abstract

Improvement of the digital tile application, lots of process revolutions have occurred in the tile production. In order to create unique and inimitable designs, all the competitors start to try different applications. Both European and domestic ceramic producers focus on the deep and realistic surfaces. In this study, trend of engoglaze, which is becoming wide spread in glaze porcelain tile designs to create the more intensive colours, were investigated. The aim of the study is to develop engoglaze formulation that support to digital ink activation. Thermal expansion coefficient values of engoglazes were determined by a dilatometer. Chemical analyses of engoglazes were made by XRF. Sintering behaviours of engoglazes were tested by heat microscopy. According to these glaze formulation studies, it has been reported that using engoglaze could easily reduce to the digital ink consumption of the design. On the other hand, both advantage of the production cost is gained and deepness of the design is provided.

**Keywords:** Engoglaze, Digital ink, Digital ink activation, Glazed porcelain tile.

## NDT APPLICATIONS IN ALUMINUM ALLOY CASTING SECTOR

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### Abstract

The aluminum alloy sector is growing production volume in order to meet increasing demand. Nondestructive inspection methods are tested in which the material is controlled without being damaged so as not to impede its use after examination. Non-destructive inspection methods are preferred primarily for the control of faulty products. Non-destructive inspection methods enable nearly 100% control of the part produced. The products that are approved by the controls can be transferred to the customers as final products. As non-destructive inspection in the sector of aluminum alloy parts, eye examination, penetrant fluid examination, pressure examination, ultrasonic examination, and radiographic examination are applied. The visual inspection method is also applied in the initial steps of the other inspection methods. Aluminum alloy part inspection is carried out considering the existing standards for inspection methods, customer specific requests, and internal quality policy determined within the company. It is expected that the produced products will meet the desired conditions for delivery to the customers.

**Keywords:** Non-destructive, Casting, Aluminum Alloys, NDT

## RESEARCH ON THE EFFECTS OF DIETARY FIBERS ON VEAL BURGER AND MEATBALL PRODUCTS

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### Abstract

Incidental products derived from the manufacturing or processing of plant based foods: cereals, fruits, vegetables, as well as algae, are sources of abundant dietary fibre. These fibre-rich by-products can fortify foods, increase their dietary fibre content and result in healthy products, low in calories, cholesterol and fat. They may also serve as functional ingredients to improve physical and structural properties of hydration, oil holding capacity, viscosity, texture, sensory characteristics, and shelf-life. Dietary fiber can effectively be incorporated in the processed meat products as binders, extender, and filler, they can significantly replace the unhealthy fat components from the products; increase acceptability by improving nutritional components, pH, water-holding capacity, emulsion stability, shear press value, sensory characters, etc. of finished products. Addition of dietary fiber in the meat products can increase the cooking yield therefore the economic gain as well.

**Keywords:** Dietary fiber, Meat products, Economic again, Texture, Holding capacity.

## DEVELOPMENT OF OZONE EFFECTING SYSTEM WITHOUT USING HARMFUL CHEMICALS

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### Abstract

Recently, some alternative bleaching methods as well as conventional bleaching chemicals have begun to be used. Conventional bleach chemistries used in bleaching include sodium hypochlorite, potassium persulfate, potassium permanganate, hydrogen peroxide, sodium perborate, sodium percarbonate, and benzoyl peroxide. In this study, an alternative bleach ozone effect was applied. Only the ozone can be used with different techniques without the use of any harmful chemicals, and the textile washing and effect giving process has been achieved. In terms of both technical and visual aspects, successful results have been obtained in comparison with the conventional method in ozone technology. It has also been observed when no chemicals are used in the washing process and water consumption has reduced the rate of 60-90%.

**Keywords:** Denim, Ozone, Denim Washing.

## THE INHIBITORY EFFECT OF CHITOSAN SOLUTION ON BACTERIAL FRUIT BLOTCH OF WATERMELON PATHOGEN (*Acidovorax citrulli*)

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### Abstract

Bacterial fruit blotch, which is caused by *Acidovorax citrulli*, is a serious threat to watermelon growers around the world. The present study was conducted to test the inhibitory effect of chitosan which has been used against a variety of plant diseases. Results showed that chitosan at 0.70 mg mL<sup>-1</sup> significantly inhibited the growth of *Acidovorax citrulli*. Pot experiments also confirmed that chitosan at 0.70 mg mL<sup>-1</sup> significantly reduced the death rate of seedlings in inoculated soil. The results indicated that chitosan may have a potential to be a promising biochemical to control this disease.

**Keywords:** *Acidovorax citrulli*, inhibition, chitosan, rhizosphere, watermelon.

## GAMMA RADIATION EFFECTS OF POLYETHYLENE AND POLYPROPYLENE BLENDS

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### Abstract

Thermoplastic polyolefins such as polypropylene that has excellent electrical and insulating properties, chemical inertness, and moisture resistance are being increasingly used as structural materials due to the good strength–toughness combination, low cost and ease of fabrication.

In this study, Polypropylene (PP) and Low density polyethylene (LDPE), which were produced by Petkim Petrochemical Holding A.Ş. blends were prepared at different ratios. Radiation of 10, 30, 50, 70, 100 kGy doses was applied from <sup>60</sup>Co source to the samples of these blends. Melting flow speed of samples, hardness, mechanical analysis (durability of strain in flowing, durability of strain for burst, extension for burst) and thermal analysis (DSC, TG) were carried out.

**Keywords:** Polyethylene, polypropylene mechanical properties, gamma irradiation.

## NEW HORIZON IN PERSONAL CARE AND ELDERLY CARE: SMART SLEEP SYSTEM

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### Abstract

Nowadays, remote monitoring and smart bed systems take a great attention to increase the level of healthy living for personal care and elderly care, provide independent living, provide patient safety and reduce maintenance costs. In this study, a novel sleep monitoring system including mobile application which is accurate and cost-efficient was developed. This system provides informing in emergency by sending messages via mobile phone to the relevant persons or entities and aims to minimize the time of medical intervention. With the help of this system, heart rate (HR), respiratory rate (RR), relative cardiac stroke volume (SV) and heart rate variability (HRV) could be monitored and tracked as well as other non-clinical values are reported such as bed occupancy status and sleep time.

**Keywords:** Smart sleep system, Healthcare, Internet-of-Things, Respiratory rate, Heart rate

## EXAMINATION OF CORROSION BEHAVIOR OF CMT WELDED AA7075 - GALVANIZED STEEL COUPLES

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### Abstract

Corrosion is the deterioration of a metal as a result of chemical reactions between it and the surrounding environment. However, it can be predicted and in some cases, it can be also slowed down or avoided substantially. Taking into account the worst-case scenario, the effects of corrosion on structures should be determined in a controlled experimental setup. In this study aimed to investigate the formation of galvanic corrosion in AA7075-galvanized steel joints produced by cold metal transfer welding and its effect on mechanical properties of dissimilar joints. As a result, increased heat input affected the galvanic corrosion negatively and enhanced the material dissolution.

**Keywords:** Cold metal transfer, corrosion, welding, steel, AA7075

## MIDDLEWARE DESIGN FOR LOAD BALANCING IN ADAS APPLICATIONS

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### **Abstract**

Nowadays, Advanced Driver Assistance Systems (ADAS) take great attention in order to lower and/or prevent the accidents. Annually, it is reported that 20-50 million people get injured and 1.24 million people die due to traffic crashes. To prevent and lower the accidents, several security systems such as lane departure warning system, vehicle detection system, advanced cruise control system, autonomous emergency braking systems (AEBS), etc., have been developed. In this paper, we aim to develop a novel middleware software including 2D surround view, lane departure, lane tracking and object detection (vehicle, traffic sign, pedestrian) by using RT-RK Alpha Board with TI's Vision SDK. The results showed that load balancing with efficient communication backbone has the enough process power for mentioned algorithms to be run simultaneously.

**Keywords:** Advanced Driver Assistance Systems (ADAS), autonomous vehicle, object detection, middleware, load balancing, Vision SDK

## DETERMINATION OF THE EFFECT OF VACUUM COOKING PROCESS PARAMETERS ON HARD CANDY QUALITY CHARACTERISTICS

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### Abstract

Hard candy is one of the sugar type confectionary products. The general ingredients of hard candy are sucrose, glucose syrup, water, acidity regulator, flavor and food coloring agent. The process steps of hard candy starts with cooking sucrose, glucose syrup and water at 145 °C and cooling to 105°C. After cooking process, acidity regulator, flavoring and food coloring agent which are food additives are added to sugar dough. In the final step, shaped sugar dough is cooled in tunnel and packaged, then ready to consumption. The shelf life of hard candy is generally 30 months at 28-32°C and 30-40% RH, 18 months at 28-32°C and 41-55 % RH. The quality characteristics of hard candy are affected by several parameters, one of them is process parameters of vacuum cooker. In this study, the influence of process parameters on quality characteristics of hard candy in vacuum cooker was determined by using Placket Burman Design. The independent parameters were chosen as sucrose-glucose syrup ratio (30-70%), cooking temperature (135-155°C) and vacuum intensity ((-190)-(-570) mmHg), the dependent parameters were chosen as water soluble dry matter, shelf life and quantity of HMF. The cooking process was followed by 4 factor "Placket Burman Design" test plan. As a result, the effective parameters and optimum processing conditions has been identified as the ratio of sucrose-glucose syrup is 30.11%, cooking temperature is 139.31°C and vacuum intensity is -570.00 mmHg. In the optimum point of hard candy, water soluble dry matter, shelf life and quantity of HMF were found respectively 96%, 17 months and 62.90 mg/kg.

**Keywords:** Hard candy, hmf, cooking