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Abstracts Booklet

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2ndInternational Congress on

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Abstracts Booklet

1-2 Dec 2022

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2nd International Congress on Multidisciplinary Natural Sciences and Engineering

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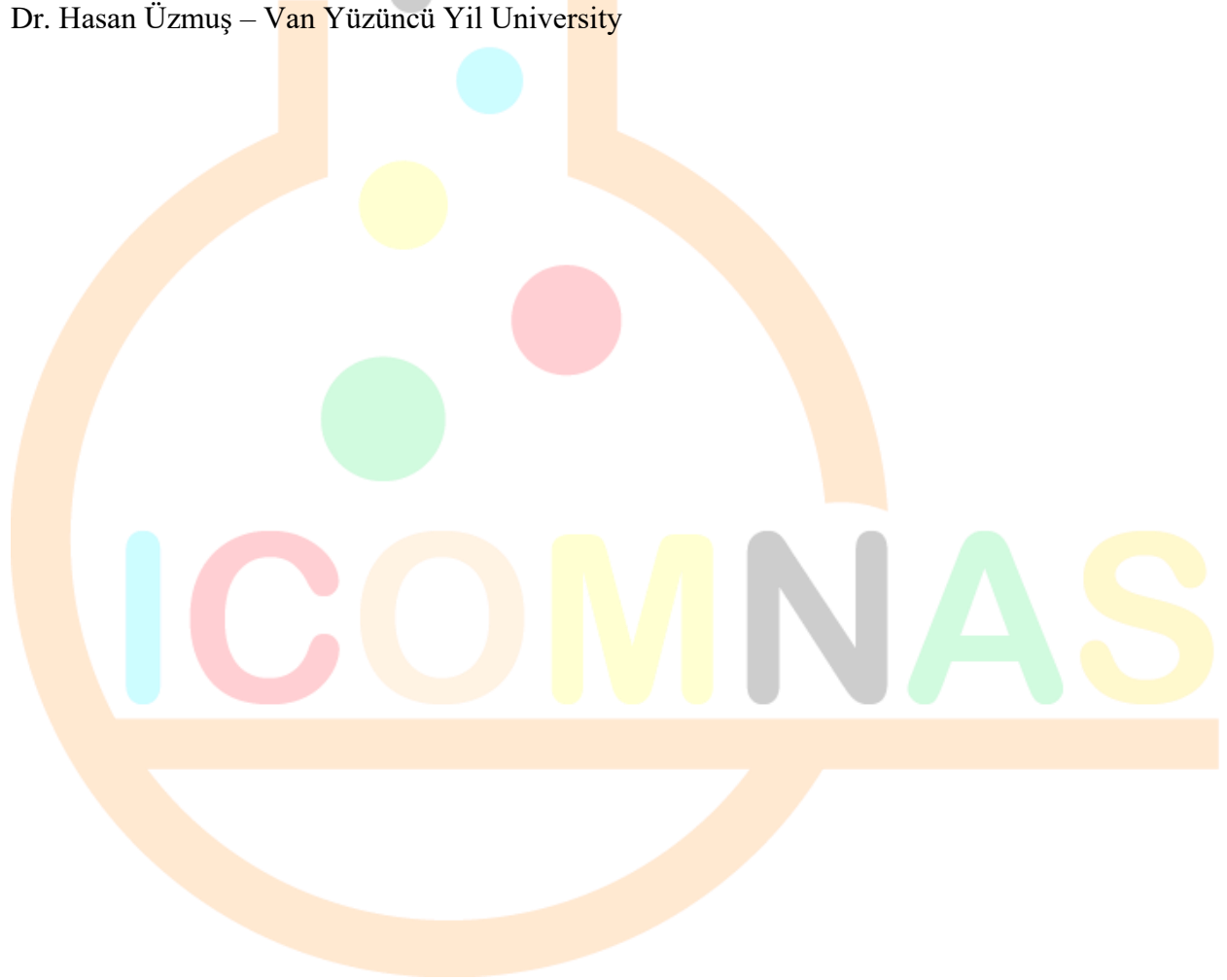
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Contents

Abstracts

Increasing Fertilizer Use Efficiency by Slowing and Controlling Fertilizer Release

Melike OĞUZ[1]

Abstract

Covid-19 pandemic, energy crisis and wars have made fertilizer prices increased due to the disruptions in raw material supply and fertilizer production and made it difficult for the farmers to access fertilizer and increasing fertilization costs have adversely affected agricultural production in recent years. More fertilizer is given to the soil than normally plant needs because of the loss of nitrogenous fertilizers in the soil through washing, evaporation and getting in useless forms. The recent solution to these problems is developing mechanisms that will allow the controlled release of fertilizers in the soil. Thus, not only preventing the loss of expensive fertilizers and environmental pollution caused by fertilizers, but also feeding the plant with fertilizer in a longer time can be achieved. Porous materials such as hydroxyapatite, zeolite, pumice stone and chitosan can be used as carriers for plant nutrients in the production of slow-release fertilizers. With chemical inhibitors, such as DMPP, DCD, NBPT, NPPT, the nitrification process of nitrogen fertilizers from ammonium to nitrate in the soil can be inhibited over the activities of Nitrosomonas and Nitrobacter bacterias. In controlled release fertilizers, urea, which is easily lost through leaching and evaporation in the soil, is coated with commercial chemical polymers such as maleic itaconic and methacrylic acid copolymers as an urease inhibitor and biopolymer materials such as pectin, starch, gum arabica, gelatin. As the coating material is degraded by the time, the fertilizer content mixes with the soil and the nitrification processes begin. Studies have shown that fertilizer use efficiency and plant productivity are increased with the use of slow and controlled release fertilizers because of plant nutrients can be found in the soil for a longer time. It is expected that, when fertilizer use efficiency is increased, less fertilizer will be used and fertilization costs will be decreased.

Keywords: Coating, Controlled Release, Fertilizer, Inhibitors, Slow Release

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Monitoring of Some Procridinae (Zygaenidae) Species in the Eastern Mediterranean Region of Turkey

Başak ULAŞLI[1]
Konstantin A. EFETOV[2]
Feza CAN[3]

Abstracst

In this study, Procridinae (Zygaenidae) species were collected by sticky traps with recently created sex attractant by Efetov *et al.*, 2014. The attractant ingredients are esters of 2-dodecenoic acid and isomers of 2-butanol. The patented names of the attractants are: EFETOV-2, EFETOV-S-2 and EFETOV-S-S-2. In all cases the control traps (without attractant) were used.

The field observations were conducted in provinces of Mersin, Adana, Osmaniye, Kahramanmaraş and Hatay in the Eastern Mediterranean Region of Turkey from May to August 2017–2018. *Adscita obscura* (Zeller, 1847) and *Jordanita anatolica* (Naufock, 1929) were attracted during the study.

According to the fixed trap data, the earliest emergence of the males of *A. obscura* among these provinces in 2017 was in Adana in the first week of May, and the latest in Osmaniye in the middle of June. The males were attracted by EFETOV-S-2 (21 males), EFETOV-S-S-2 (1 male) and EFETOV-2 (67 males) attractants (except Hatay and Kahramanmaraş provinces). This species was not attracted by traps in 2018.

The males of *J. anatolica,* on the other hand, were first seen in the third week of May in the provinces of Osmaniye and Kahramanmaraş, and were last recorded in Adana and Mersin in the middle of July in 2017 (EFETOV-S-2 – 20 males, EFETOV-S-S-2 – 1 male, and EFETOV-2 – 30 males). In 2018, *J. anatolica* was seen from the first week of May in Adana and Mersin, and until the middle of July in the same provinces. The males of this species were attracted by all attractants (EFETOV-S-2 – 20 males, EFETOV-S-S-2 – 1 male, and EFETOV-2 – 69 males) in the whole study area.

According to the data obtained, it is observed that the flight time of both species is approximately one and a half month, although it varies in relation to the provinces and years in the studied region.

Keywords: Population dynamics, Procridinae, Zygaenidae, Eastern Mediterranean Region, Turkey

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Evaluation of Grapefruit Peel Extract for Control of *Meloidogyne Incognita* on Tomato

Fatma Gül GÖZE ÖZDEMİR[1]

Abstract

The aim of study was assess the nematicidal potential of grapefruit peel extract against the root-knot nematode *Meloidogyne incognita*. Varied concentrations of dry powder (3.0, 6.0 and 9.0 g/per pot) and aqueous extracts (undiluted, diluted concentration of 10%, 25% and 50%/per pot) from grapefruit peels as a soil amendment were investigated on *M. incognita* in Tueza F1 tomato cv. Only plants treated with nematodes were used as a control. Five replicated pots per treatment were used. The 1000 second juvenile (J2) was used in the nematode inoculum. Two days after nematode inoculation, different rates of powdery extracts were incorporated into the soil by sprinkling it over the soil around the plant. Fifty millilitre of aqueous extract was measured and applied to each of the pots using the various concentrations obtained. After six weeks, counted galls and egg masses in roots. Evaluation was made according to the 0-5 root gall index. The lowest number of galls and egg masses was found in 9 g/1 kg soil dry powder, undiluted and 10% diluted/ 1 kg soil aqueous extract treatments. The gall index of 25% and 50% diluted aqueous extract concentration treatments were found to be similar to the control. All dry powder treatments of gall index were determined significantly lower than the control. The above findings showed that grapefruit peel extracts may be reduce the damage of root knot nematode in tomato.
Keywords: Root knot nematode, biological control, grapefruit, peel extract, nematicidal effect

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Title

Ali SELLİ

Abstract

Keywords:

Impact of Flooding on the Environment in Serbia

Milena MILOJEVIĆ[1]
Suzana KNEŽEVIĆ[2]

Abstract

In the territory of the Republic of Serbia, floods are occurring more and more often as a result of climate change, harmful anthropogenic activities and insufficiently constructed flood protection systems. In addition to the classic manifestation of floods (caused by the pouring of large waters from the riverbed), the phenomena of torrential lava, landslides and landslides occur at the same time, resulting in the destruction of material and cultural assets, the destruction of ecosystems and sometimes the loss of human lives. According to estimates, approximately 12.4% of the territory of Serbia is threatened by floods. Floods most often occur in the valleys of the Tisa, Sava, Velika Morava and Danube rivers. 11,500 torrential watercourses have been registered in Serbia, while erosion processes, as one of the factors causing torrential floods, are present in 75% of the territory. The damage caused by floods to the environment is manifested as: soil degradation, pollution of underground and surface water, endangering biodiversity, generation of waste due to the demolition of residential and traffic infrastructure, and the occurrence of infectious diseases. The aim of this work was to point out the impact of floods on the environment in Serbia, as well as the importance of taking preventive measures and activities to prevent them. In order to solve this problem, it is necessary to change the legal legislation in this area, provide material resources, apply modern models for forecasting and monitoring of potential flood hazards, as well as raising the awareness of the population. In addition to national measures to reduce the risk of floods, international cooperation in this area is also very important.

Keywords: flood, impact, environment, Serbia

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Influence of Noise and Vibration of Agricultural Machines on Human Health

Suzana KNEŽEVIĆ[1]
Milena MILOJEVIĆ[2]

Abstract

European and world standards treat noise as one of the biggest polluters of the work and environment. Noise and vibrations that occur during the use of agricultural machinery cause a number of harmful consequences for the mental and physical health of people who operate agricultural machinery, primarily tractors. Previous research indicates that the age and correctness of agricultural machinery is of great importance when analyzing this problem. A person is exposed to the highest intensity of noise and vibrations in the tractor cabin, and since he spends more hours during the day at that "workplace", the risk of developing an illness increases. The risk increases further if the number of working days is greater. Prolonged repeated exposure to low-intensity noise can have the following consequences: hearing loss, fatigue, attention deficit disorder, insomnia, and in some cases, dysfunction of certain organ systems (heart, blood vessels, endocrine glands, etc.). Exposure to the effect of vibrations can cause in the initial phase: frequent and persistent headaches, a feeling of "heaviness" in the head, vertigo attacks, general fatigue, irritability and sleep disturbance. Further exposure to vibrations can lead to: serious damage to bone and muscle tissues (especially the lower extremities and spine), problems with circulation, heart, endocrine glands, metabolic disorders, etc. The aim of this paper was to point out the impact of noise and vibration of agricultural machinery on human health and the importance of preventive action and human protection. In their research, the authors used data that mainly refer to the situation in the Republic of Serbia.

Keywords: noise, vibrations, agricultural machines, health

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The significance off the application of agricultural mechanization on dairy farms in the function of sustainable development in Serbia

Suzana KNEŽEVIĆ[1]
Milena MILOJEVIĆ[2]
Jelena IGNJATOVIĆ[3]
Goran STANIŠIĆ[4]
Aleksandra MILOŠEVIĆ[5]

Abstract

The impact of the sustainable use of resources on the agriculture of the Republic of Serbia is exceptional and crucial for the further development of ecological principles and agribusiness. Given that we are moving towards sustainable development, Serbia's position is aimed at harmonizing agricultural policy with the European Union and harmonizing environmental protection policy, i.e. sustainable use of resources, for a longer period of time. The aim of this paper is to point out the importance of agricultural mechanization on dairy farms in Serbia in the function of sustainable development. Basic equipment on dairy cow farms includes: equipment for feeding, feeding and maintaining hygiene, equipment for milking and storing milk, as well as equipment for milk processing. Mechanization is used for various tasks on the farm, primarily for the preparation of animal feed. For this purpose, tractors and attached machinery are used for cultivating and preparing the soil, sowing and preparing fodder. To increase milking productivity, different models of automated milking robot systems are used. Dairy farms generate significant amounts of by-products - manure. Previous experiences in Serbia show that the methods of manure manipulation are insufficiently efficient, often with many omissions, because a good part of the nutrients is lost uncontrolled, which can cause environmental pollution. This problem needs special attention in the future. In addition to the introduction, the paper consists of three parts. The first part of the paper shows the importance of sustainable development for agriculture in Serbia. The second part analyzes the importance of rational planning and the use of agricultural mechanization, while the third part of the paper indicates the current state of dairy cow farms caused by the current shortage of milk on the Serbian market. At the end, the concluding considerations of the author are given.

Keywords: agriculture, mechanization, cow farms, sustainable development, Serbia.

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The Roles for *Phytophthora citrophthora* and *Phytophthora nicotianae* in Grapefruit Decline and Gummosis in Türkiye

İlker KURBETLİ[1]

Abstract

Severe decline and gummosis have occurred on 20- to 30-year-old grapefruit trees in commercial orchards in Aksu, Manavgat, Muratpaşa and Serik districts of Antalya province located in the Mediterranean region of Türkiye in the summer of 2020. Affected trees exhibited leaf discoloration, defoliation and severe dieback. Dark, water-soaked lesions with gum exudates, characteristic symptoms for *Phytophthora* infections, were formed on the bark of the main stem and major limbs. No *Phytophthora* spp. could be isolated from these bark tissues, but two were obtained from soil samples of symptomatic trees, using baiting and selective medium. Isolates were identified as *P. citrophthora* and *P. nicotianae* based on morphological characteristics. These identifications were confirmed by sequencing of the internal transcribed spacer (ITS) and the cytochrome oxidase I (*cox*1) gene regions. Pathogenicity by main stem and branch inoculation on grapefruit seedlings cv. Star Ruby indicated that both *P. citrophthora* and *P. nicotianae* were pathogenic. *Phytophthora citrophthora* was previously known to cause disease on citrus in Türkiye, but this is the first report of *P. nicotianae* causing citrus gummosis disease in Türkiye. Because of more widespread found than *P. citrophthora*, *P. nicotianae* can be considered a potential threat to citrus cultivation of this region of Türkiye.

Keywords: Oomycete, *Citrus paradisi*, Star Ruby, gummosis, potential threat

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The Effect of Organic, Chemical Fertilizers and their Combined Use on Root Nutrients in Different Strawberry Cultivars

Neslihan KILIÇ[1]

Hayriye Yıldız DAŞGAN[2]

Abstract

Due to increasing strawberry production and consumption each year, it has become more critical to determine the nutrient elements that strawberry requires in different climatic and soil conditions for better yield. Therefore, this study investigated the effects of organic and chemical fertilizers along with their combination on the root mineral composition of different strawberry cultivars. The experiment was carried out on the site for agricultural experiments of Osmaniye Korkut Ata University in 2018-2019. Strawberry varieties, including Albion, San Andreas and Monterey, were used as cultivars in the experiment. The study consisted of applying three different treatments: organic fertilizer, chemical fertilizer and a combination of both fertilizers. Liquid organic fertilizer of vegetable origin was used as organic fertilizer, while the composition of chemical fertilizer was formed with 21% Ammonium sulfate, Mono ammonium phosphate, Potassium sulfate, and Magnesium sulfate. In the combination of 50% organic + 50% chemical fertilizer treatment, half of the doses applied in chemical fertilizer and organic fertilizer treatments were provided to the plants. The analysis of nitrogen, phosphorus, potassium, calcium, iron, zinc, manganese and copper was carried out in the root. As a result of the study, the highest content of nitrogen (1.17%), phosphorus (0.15%), and calcium (2.39%) macro nutrient elements in the root were observed in the chemical treatment. In contrast, the highest potassium content was found in the organic treatment. Finally, regarding the microelements in the root, the highest iron content was determined in the organic treatment, whereas the highest zinc content was observed both in the organic and organic+chemical treatment. The highest copper content was found in the combined treatment of organic and chemical fertilizers.

Keywords: Strawberry, Organic fertilizer, Chemical fertilizer, Organic+chemical fertilizer, Root Nutrient

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Lethal effects of some Entomopathogenic fungi on Orius laevigatus (Fieber) (Heteroptera: Anthocoridae)

Asiye UZUN YİĞİT[1]

Abstract

This study, it was aimed to determine the lethal effects of the entomopathogenic fungus *Beauveria bassiana* BIM-001 and *Fusarium subglutinans* 12A on *Orius laevigatus* new adults. Different doses of *B. bassiana* BIM-001 (1×10^4, 1×10^6 and 1×10^8 spore/ml) and *F. subglutinans* 12A (1×10^6 spore/ml) were applied in 9 cm diameter Petri dishes by spray method (4 atm) for 5 seconds in mist. The study was performed in a randomized plot design with 10 replications. 5 adults were used in each petri dish and each dose was tested on 50 individuals in total. For control, pure water was used instead of spore suspension and Tween 20 (0.1%) was added to it. Live and dead counts of *O. laevigatus* individuals in Petri dishes were made 3 and 5 days after the application. Obtained mortality rates were calculated according to Abbott's and one-way analysis of variance Tukey multiple comparison test (SPSS® 20.0) was performed on these data. According to the results of the study, it was determined that there was no significant difference between the mortality rates of *O. laevigatus* adults 3 and 5 days after the application of 1×10^4 spore/ml and 1×10^6 spore/ml of *B. bassiana* BIM-001 under laboratory conditions ($p > 0.05$). There was no difference between the mortality rates at 1×10^8 spore/ml dose of *B. bassiana* BIM-001 and 1×10^6 spore/ml dose of *F. subglutinans* 12A, but it was found to be higher and significant than other doses ($p < 0.05$). On the 5ᵗʰ day after the application, *B. bassiana* BIM-001 10^4 spore/ml was non-toxic for *O. laevigatus*, while 10^6 spore/ml dose of *F. subglutinans* 12A and *B. bassiana* BIM-001 and 10^8 spore/ml dose of *B. bassiana* BIM-001 were slightly toxic.

Keywords: Predator, biological control, side effect

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Investigation of Bacterial Diseases in Natural and Cultured Fish in Malatya Province

Mikail ÖZCAN [1]

Mehmet ŞEN [2]

Abstract

In this study, it was aimed to screen in terms of bacterial diseases that are frequently encountered in fish farmed and fished in Karakaya Dam Lake, Sürgü Stream, Darende Ayvalı Stream in the province of Malatya. For this purpose, between January 2020 and May 2021, samples were taken from 18 different farms from rainbow trout weighing 5-500 grams, and from 3 different fishing sites from blackfish, and liver, spleen, kidney and intestines from carp.

For the isolation of bacterial disease agents; Tryptic Soy Agar (TSA), Nutrient Broth (NB) and Brain Heart (Infusion) Agar (BHIA) Tryptone Yeast Extract Salt Agar (TYES-A) were used. These media were incubated at 15-24 oC for 24-72 hours in an incubator. Antibiogram susceptibility test was performed on naive colonies by disk diffusion method.

Biochemical identification tests were applied to the pure strains obtained from these samples taken from the trout farms at the same time, and the phenotypic characteristics were examined by applying the Biolog System (The biolog GENIII micro plate).

As a result; Yersinia ruckeri, Lactococcus garviae, Vibrio anguillarum, Aeromonas hydrophila and Acinetobacter johnsonii strains determined according to the phenotypic and biochemical properties of the bacteria were isolated and identified.

Keywords: Fish, Bacteria, Biolog System

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Analyses on Essential oil and Hydrosol Compositions of *Origanum amanum* Post

Nadire Pelin BAHADIRLI[1]

Abstract

The *Origanum* L. genus from Lamiaceae family has 43 species and 19 hybrids in the World. Flora of Türkiye is very rich in terms of *Origanum* species. The flora of Türkiye occurrs in 21 species with 12 hybrids, furthermore six species naturaly occur in Hatay province. Hatay is located in the East Mediterranean part of Türkiye. *Origanum amanum* is a perennial, endemic species with spectacular pink flowers from Hatay province of Türkiye. The aim of the study was to determine composition of essential oil and hydrosols of *Origanum amanum*. In the present study, *Origanum amanum* from flora of Hatay were harvested during flowering period of 2022. Essential oils and hydrosols were analysed with Gas Chromotography/Mass Spectrometry device. Essential oils were obtained with hydro-distillation method. In the essential oil main components were found as carvacrol with 52.11%, o-cymene with 14.93%, caryophyllene with 4.37% and borneol with 3.70%. In the hydrosol only four volatile components were determined as follows: carvacrol with 88.35%, caryophyllene-oxide with 5.33%, o-cymene with 3.84% and trans-caryophyllene with 2.48%. Furthermore soil properties were also determined in the study. Soil type was loamy, pH 7.54, EC 118 μs/cm, organic matter 1.40% and lime 34.6%. The results of the study shows that *Origanum amanum* could be both used as a spice and an ornamental plant. Further studies should be focus on reproduction of the species.

Keywords: Endemic, *Origanum*, volatile, GC/MS

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Import, Export, Production and Future Projection and Evaluation on Some Vegetables in Turkey

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Derya BAŞAK UT[3]

Abstract

Keywords:

[1]
[2]
[3]

Determination of Chemical Compositions of *Teucrium Polium* L. and *Ocimum Basilicum* Grown Under Eastern Mediterranean Ecological Conditions

Nadire Pelin BAHADIRLI[1]

Abstract

Plants have been used for their nutritional, medicinal and cosmetic value for a long time. Cultivation of medicinal and aromatic plant species has been important for protecting natural populations, standardize the active ingredients. Eastern Mediterranean region of Türkiye with typical Mediterranean climate has an advantage for cultivation that both autumn and spring is suitable for many crops to grow. The genus *Ocimum* from Lamiaceae family comprises 65 species mainly distributed to Asia, Africa, and South America. The genus has annual or perennial, herbs and shrubs with high medicinal and aromatic properties. *Ocimum* species beyond used as flavoring agent, species also important for cosmetic and medicinal industries due to their active biological ingredients. The genus *Teucrium* is also from Lamiacea family that the speciation center of the genus is Mediterranean with approximately 300 species. Latest studies presented that 47 taxon including 15 endemic species from flora of Türkiye. Teucrium species generally have been used for anti-diabetic and stomachache problems. The aim of the study was to determine essential oil composition of both *Ocimum basilicum* and *Teucrium polium* that cultivated in the Eastern Mediterranean ecological conditions. Main component of *Ocimum basilicum* found as follows: linalool 42.5%, cinnamic acid 37.96% and 1.8 cineole 7.44%, while *Teucrium polium* main components were trans-caryophyllene 40.18%, caryophyllene oxide 12.83% and δ-cadinene 10.73%. The results showed that both species has valuable composition for medicinal and cosmetic industries.

Keywords: Germander, basil, volatile, GC/MS

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Determination of Damage Status of Fake Butterfly [Orosanga japonica Melichar 1898 (Hemiptera: Ricaniidae)] on Tea

Mansur ULUCA[1]
Kibar AK[2]

Abstract

Turkey's tea plantations and other agricultural areas, while there were no significant problems in terms of diseases and pests until 2006, the presence of *Orosanga japonica* Melichar 1898 (Hemiptera: Ricaniidae), an invasive pest species, has been detected since this date. This pest damages some agricultural products such as kiwi, beans and tomatoes. In addition, it was thought that pest also caused damage on tea plants. In this study, it was investigated whether *O. japonica*, which causes damage on some agricultural and forest plants, harms the tea plant. The study was carried out in the nymphal and adult stages of the pest (from the beginning of July to the end of August) in Atatürk Tea and Horticultural Research Institute, Rize, where the population is high in 2018. Each cage, containing five tea saplings and common wormwood plants, was supplied with 50-75-100-150 nymphs. Experiments were conducted in 5 replications. At the beginning of the adult period in August, it was determined that 17.8% of the nymphs reached into adult stage in cages with wormwood and nymphs were not able reach into adult stage in cages with tea saplings. In addition, the fresh shoots of tea saplings were examined in terms of necrosis, chlorosis, tissue deformations and fumagine formation and *O. japonica* nymph damage was not detected. Despite this result, there is a common belief that *O. japonica* causes harm in tea. This is because the distinctive damage of Yellow tea mite (*Polyphagotarsonemus latus*) (Acarida: Tarsonemidae) on fresh tea shoots, which cannot be macroscopically detected in the 3ʳᵈ shoot period, especially in pruned orchards is generally confused with *O. japonica*. The inability of *O. japonica* nymphs to complete their biological cycle and to pass into adult stage in cages with tea saplings indicated that pest was not able to feed on tea.

Keywords: *Orosanga japonica, Camellia sinensis*, damage, polyphagous pest, Eastern Black Sea Region

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Some Production Traits of Kilis Goats Raised in Doğanhisar

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Birol DAĞ[2]

Abstract

Considering various feeding conditions, 3 farms were determined, data of 100 Kilis goats were collected in the study, and their withers height, head and body lengths, rump width, live weight, chest circumference and ear lengths were measured. Within the scope of the project, the rate of conception of Kilis goats, the number of infertile goats, the number of goats that gave birth, the number of kids born per six goats (TKDO), the number of kids per goat that gave birth (DKDO) and the results of weaning per six goats according to the rearing results. The number of kids (TKSO), the number of kids living at weaning per birth goat (DKSO) and their survivability were determined. In order to reveal the growth performance of kids from birth, birth, weaning (2nd month), 3rd and 6th month live weights of all kids and 25 female and 25 male kids' body measurements (withdrawal height, body length, chest circumference) were determined in each farm. , thigh circumference, shank circumference, breast width, rump width and breast depth), milk control was carried out once a month, in the morning and evening, until the end of lactation, which will start 25 days after the start of the goats in Kilis goats in the enterprises within the scope of the project. Fleischmann method was used to calculate lactation milk yields. In addition, lactation period, daily average milk yield and daily maximum milk yield were calculated. The effects of age and birth type on the investigated milk yield characteristics were also investigated. The data on body measurements and yields obtained within the scope of the thesis project were compared with the data in the region where the Kilis goat was originally bred. Thus, the adaptation of Kilis goats to Doğanhisar location and their productivity in the regional conditions were revealed. In the research, the Chi-Square analysis was used to compare the fertility characteristics and the values of viability. The effects of age and race on body size and milk yield characteristics, and environmental factors such as genotype, gender, birth type and maternal age on the characteristics examined in kids were determined by the Least Squares Method. Minitab 14 package program was used for statistical analysis. Duncan test was used to control the difference between subgroup means.

Keywords: Adaptation, Doğanhisar, Kilis goat, Konya, structural features

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Energy Generation from Autoclave Waste Heat by Organic Rankine Cycle

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Ahmet ELBİR[2]

Abstract

Many of the medical surgery and instruments are used repeatedly by sterilization, passing into the body. One of the methods used for sterilization is done with heat. Heat degrades enzymes and structural proteins of microorganisms. Heat sterilization is an easy, inexpensive and reliable method. Autoclave devices are most commonly used in heat sterilization. These devices perform sterilization under pressure with moist heat. Many studies have been conducted to evaluate the child's energy consumption. These include energy resources. Energy production was carried out using ORC (Organic Rankine Cycle) from the waste steam heat of the autoclave device in a sterilization unit that does not contain this. The waste heat energy to be obtained from the waste heat source is calculated as 5.3 kW. This energy is transferred to the ORC cycle. Ammonia (R717) and Isobutane (R600a) natural refrigerant casings were used in this cycle. Thermodynamic analysis of these cavities were made and the results were compared. Accordingly, the energy saving for ammonia was 16.8% and the net energy produced was 0.793kW. The energy source for isobutane was 15.3%, and the net electrical energy produced was 0.732 kW.

Keywords: Autoclave, Energy, ORC, R717, R600a

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Transfer Press Design for the Defence Industry

Ergun ATEŞ[1]
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Abstract

In this study, first of all, ammunition and weapon systems and related standards and patent studies were examined. Afterwards, the types of cartridges used and the characteristics given in NATO standards, as well as the transfer presses used in the production of bullet and their design and manufacturing studies were investigated. The design of a 40-ton-capacity transfer press with the mould system required to produce 9x19 mm bullet, which is the main objective of the study, has been completed. In the design and analysis studies, information is given about the working system of the transfer press designed for ammunition production. In the designs, the manufacturing process of the press and bullet and the forming processes of the punches and moulds in the stations were examined in detail. Solidworks 2016 program was used in the designs. In the analysis of all the components of the design system, Ansys Workbench 2019 R2 Academic program was used, and the displacements and stress values were calculated with the finite element method. It is envisaged that it will be possible to produce bullet of other calibres, mainly 7.62x51 mm, 5.56x45 mm and 7.62x39 mm, by making design changes in the design press, punch, die and some hardware elements.

Keywords: Bullet, ammunition and firearms, ammunition production equipment, transfer and eccentric press, punch and die design.

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Single Parameter Influence Investigation on Cavitation Induced Erosion using CFD Simulation

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Abstract

In gasoline direct injector (GDI), there is a phenomenon called cavitation erosion, especially around the valve nozzle and needle ball. Cavitation induced erosion may cause damage on the surface inside of the injector during the lifetime. This can lead to functional deviations such as fuel flow rate change, disturbances in the spray formation, deviation of the spray target coordinates, and leakages issues. So, to fulfill strong injector requirements the cavitation erosion impact should be minimized. There are several influence parameters on cavitation and cavitation induced erosion behaviour. System pressure, combustion chamber pressure (back pressure), and needle dynamic have a great effect on cavitation. In addition, cavitation and cavitation erosion varies depending on the position and speed of the needle. Therefore, the root cause analysis of cavitation erosion damage under real operating condition is a big challenge.

In this study, in-nozzle flow simulations using CFD++ solver have been conducted for a real operating condition as a reference case with using the ethanol fuel E100 at a temperature of 75°C. Thereby, two critical phases of needle movement are considered. The first is the time period in which the needle moves away from the sealing area (opening event); the other one is the arrival of the needle ball from the nominal lift value to the sealing area (closing event). Furthermore, artificial conditions have been created in addition to the real operating condition. For example, by varying the system pressure in two different directions for constant needle speed and back pressure. Erosion analysis has been conducted based on CFD simulation results for all cases. Due to these artificial conditions, we could investigate the singular effect of each parameter as system-, back pressure and needle speed on cavitation erosion. As a result, detailed understanding of the cavitation and cavitation induced erosion mechanism around the valve nozzle is increased.

Keywords: GDI Injector, E100 fuel, CFD, Cavitation, Cavitation induced erosion

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The Elevated Temperature Wear Behaviors of Y₂O₃ Reinforced A356 Alloy Composite Materials Produced by Mechanical Alloying Method

Ü. Doğan ŞİMŞEK[1]

Abstract

In this study, the wear performance at elevated temperatures of composite materials Yttrium oxide (Y_2O_3) reinforced produced by mechanical alloying method was investigated. The composition of the composites was prepared by adding two different ratios (6% and 12%) of Yttrium oxide and 2% graphite by weight. The prepared powders were mechanically alloyed in a planetary type of mill for 4 hours. Mechanically alloyed composite powders were pressed in a single-acting hydraulic press under 600 MPa pressure and green compacts of Ø12x6 mm were produced. The green compacts produced were sintered under a vacuum of 10^{-6} mbar at 600 °C for 1 hour and cooled to room temperature. Standard metallographic processes of the produced composite materials were performed and then hardness and density measurements were made. Wear tests were performed according to ASTM G-99 standards by adding a temperature module in a pin-on disc type wear test device. As a result of the microstructure studies, it was determined that the reinforcement phase added to the matrix clustered at the grain boundaries. In the hardness and density results of the produced composite, it was seen that the hardness and density increased with the increase in the amount of reinforcement added to the matrix. Highest hardness and density were observed in the composite material to12% Y_2O_3 was added. In the wear test results, the weight loss of the composite decreased at all loads and temperatures with the increasing amount of reinforcement in the matrix. At high temperatures, it was observed that weight loss and wear rates increased in parallel with the increase in temperature. In the results of the friction coefficient, it was observed that the friction coefficient decreased with the increase in the amount of reinforced, and the friction coefficient increased with the effect of load and temperature.

Keywords: Mechanical alloying, A356, yttrium oxide, wear, elevated temperature

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The Novel Design of Open Refrigerated Display Cabinet's Shelves

Ayşe Burcu ÇELİK[1]
Ebubekir BEYAZOĞLU[2]
Salih COŞKUN[3]

Abstract

In this study, in order to ensure energy efficiency and uniform temperature distribution in open vertical type refrigerated display cabinets, the short-pipe ventilation design have been applied to the bottom of the shelves. Model was simulated using by the three dimension computational fluid dynamics method Ansys Workbench module and the energy efficiency was compared with the traditional refrigerated display cabinet. Using the CFD method and the data obtained from the literature study, the cooling loads of traditional cabinet and new design refrigerated display cabinets were calculated. As a result, it has been calculated that the new design works 20 % more efficiently in terms of energy consumption. Addition to this, it has found that COP increased 0, 65 compared to traditional cabinet.

Keywords: Open type refrigerated cabinets, energy efficiency, 3D computational fluid dynamics, psicometric diagram, short pipe

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An Investigation on Thermal Barrier Coating Applicability of Inconel 601 Super Alloy with %8 YSZ Powder

Nida Nur ERDOĞAN[1]
Aziz Barış BAŞYİĞİT[2]

Abstract

Superalloys, which are categorized in three groups as iron-based, nickel-based and cobalt-based, are used especially in high temperature applications. Inconel 601 alloy, a nickel-based superalloy, is widely used in applications such as chemical processing, aerospace, power generation, heat treatment, chemical refining and gas turbine engines. Although the mechanical properties of superalloy materials and their resistance to wear, corrosion and oxidation are better than other metallurgical materials, these properties are not satisfactory in some applications. In such cases, the desired properties can be obtained by applying heat treatment and coating processes to superalloys. Ceramic thermal barrier coatings are applied to the surface of the super alloy components to protect and prolong their lifetime of high temperature components in modern gas turbines. In this study, thermal barrier coating was applied to the Inconel 601 super alloy using NiCrAlY for bond coat, 8 %YSZ powder for ceramic top coat. Subsequently, SEM-EDS and XRD analyzes were performed on coated and non-coated samples and the results were given.

Keywords: Inconel 601, TBC, %8 YSZ, Strength of Nickel Based Super Alloys, Surface Treatments Applied to Nickel Based Super Alloys.

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Effects of Solar Panel Deployment Angle on Radiative Heat Input for a 3U CubeSat at LEO

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Metin AKTAS[2]
Nedim SOZBIR[3]
Ünal CAMDALI[4]

Abstract

CubeSats have become popular issue lately because of their pros on size, cost, and manufacture options. Thermal modeling and simulation of them are utilized to evaluate and improve their thermal stability and performance in space conditions. By that way, the heat budget can also be estimated to select proper design, materials, and equipment.

In the literature, however, the studies focusing on CubeSats with deployed solar panels at different angles are limited. Due to the reason, we investigate the effects of solar panel deployment angle on radiative heat input for a 3U CubeSat orbiting at low Earth orbit (LEO) level in this study. With this aim, the solar panel deployment angles of 75, 60, 45, 30, 15, 0, -15, -30, -45, -60 and -75 degrees are simulated through the Systema Thermica, a commercial software. Besides, various orbital positions corresponding to different earth days are examined for the 3U CubeSat with fully deployed solar panels. In addition, the heat absorbed by CubeSat structural panels and its solar panels are analyzed in detail. The results show that solar panel deployment angle affects the satellite heating, and hence maximum heat input occurs at the deployment angle of 15 degrees. It can be here noted that our results of this study may give rise to valuable contribution for optimizing the design and energy budget of CubeSats. Furthermore, the available energy harnessed by solar panels can be maximized accordingly.

Keywords: CubeSat, Deployment angle, Thermal analysis, Thermal modeling, Solar panel

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Assessment of the Insulation Material for the Train Envelope

Mustafa Dönmez
M.Mete Öztürk
Bahadır Doğan

Abstract

The energy efficiency is one of the hot topic in transportation across the World due to the energy crisis emerges in last decades. Furthermore, the rising environmental concern leads the researchers to improve the recent systems in order to descend the energy consumption which would help the reduction of CO2 release during operation.

Rail transportation has an unavoidable role in passenger transportation all around the World. And HVAC has a major importance for a comfort ride for the passengers during their travel. It solely consumes almost %30 of the total energy per travel in railways. Since it plays a major role in the energy consumption, in recent years several researchers have focused on the reduction of the energy consumption for this particular content (energy consumption for heating-cooling during railway transportation).

In this particular work, the impact of insulation material type and thickness of it on the energy consumption is investigated numerically. A parametric work has been conducted with the help of a commercially available software which helps to figure out the optimum range and allows to obtain the right parameters for the train envelope.

Keywords: train envelope, insulation material, numerical analysis, railway, insulation material, energy efficiency

Autonomous Maintenance Concept in Total Productive Maintenance Design

Onur KÖLEOĞLU[1]
Adnan AKKURT[2]

Abstract

Keywords

[1] Gazi Üniversitesi, Fen Bilimleri Enstitüsü, Ankara, Türkiye
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The Effect of Key Maintenance Performance Indicators on Total Productive Maintenance

Onur KÖLEOĞLU[1]
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Abstract

Keywords

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Investigation of the Effect Of Different Bearing Applications on Roll Fluting and Grinding Machine Productivity

Sefa YEĞİN
Murat DİLMEÇ
Mehmet BAĞCI

Abstract

Keywords

Investigation of The Effect of Applying Different Heat Treatment Temperatures to RF Coated FeNi Films on The Morphology of The Film

Mehmet POYRAZ[1]

Abstract

With the rapid development and miniaturization of electronic devices in recent years; The demand for high frequency soft magnetic thin films used in converters, inductors and other electromagnetic devices has increased. In this study, $Fe_{80}Ni_{20}$ films, known as soft magnetic materials; It was grown on cleaned Si(111) substrates at room temperature and in an argon atmosphere using the RF Magnetron Sputtering Method, which is one of the Physical Vapor Deposition methods. A composite $Fe_{80}Ni_{2O}$ (wt%) target was used during the RF coating of the films (50.8 mm in diameter and 3.18 mm in thickness). Base pressure and argon operating pressure in the vacuum chamber ($2x10^{-5}$ Pa) and (0.4 Pa) were applied, respectively. 200W RF sputtering power and 30 minutes coating times were applied to the coating of FeNi films. Subsequently (at temperatures of 150, 300 and 550 ºC), (24 hours) heat treatments were applied to the films. Surface imaging of $Fe_{80}Ni_{20}$ films, which were heat treated at different temperatures, was performed using Scanning Electron Microscopy (SEM). Composition amounts of the films formed were determined by the energy dispersive spectroscopy (SEM-EDS) of the SEM microscope. X-Ray Diffractometer device was used to see the change in the crystal structures of the films subjected to heat treatment at different temperatures. X-Ray Diffraction measurements of heat treated films; carried out at room temperature. Measurements; It was carried out in the range of 3º≤2θ≤80º, at a scanning speed of 1 der/min, and the XRD patterns and the peak lists of these patterns are presented. As a result of the analysis, it was determined that the grain size of the films increased depending on the heat treatment temperature.

Keywords: $Fe_{80}Ni_{20}$ films, RF Magnetron Coating, Heat Treatment

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Experimental Research of Hybrid Thermoset Composites Mechanical Properties

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Selim Hartomacioğlu[1]
Metin Yüksek[2]

Abstract

This study main purpose is to research and compare thermoset hybrid composites mechanical properties produced in two different types as 5 layers (5L) and 9 layers (9L).As reinforcement material, In the first material (type 1) plain wowen carbon (PW) glass fiber (GF),polypropilen mat(non-wowen) fabric (GN) and plain wowen carbon (PW) glass fabric (CF) and epoxy resin as thermoset matrix were used. The other (type 2), 2x2 twill wowen (TW) carbon fabric were used with the other fibers and matrix being the same. Then the tension strength, modulus of elasticity and other mechanical properties of two different epoxy hybrid composite (EHC) were examined and compared. The tension test method was used to find the mechanical properties of EHC. In addition, 5L and 9L EHC fiber and matrix volume fractions of both materials were obtained with the help of the burning test method. Also with this method areal and volumetric densities of EHC materials were determined. Graphs and tables were created for both materials from the data obtained from test results. In addition, damage analyzes were performed using stereo microscope image to determine how EHC were damaged under tensile loads.

Keywords: Hybrid composites, epoxy resin, mechanical properties, damage analysis

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Using Various Renewable Energy Sources in Commercial Kitchens and Ensuring Energy Efficiency

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Hakan Serhad SOYHAN [2]

Abstract

Commercial kitchen products (oven, cooker, grill, dishwasher, refrigerator, etc.) are widely used in places where there is mass food consumption (restaurants, hotels, dormitories, shopping centers, etc.). These products generally work with electricity or gas (natural gas, LPG, etc.) depending on the place of use. In addition to the negative effects of fossil fuels on the environment, the demands of consumers for environmentally friendly energy-using products are increasing in the face of the problems experienced in reaching various energy sources in the global arena. The importance of technological products is increasing in the field of commercial kitchen in order to reduce the carbon footprint value and to expand the use of green energy resources. Within the scope of this study, evaluations were made regarding the use of renewable energy (hydrogen, biogas, solar energy, wind energy, etc.) for various products in commercial kitchens and various studies to be carried out in the future. Innovative prototypes with original designs have been developed with activities based on R&D systematics, especially for commercial kitchen cooking products that use hydrogen and biogas from renewable energy sources. With the data in the test and evaluation stages, it has been achieved to use renewable energy sources effectively and efficiently in innovative prototypes.

Keywords: Commercial kitchen products, eco-friendly productions, renewable energy, alternative fuels, green technology

Designing a Novel Stacking Mechanism Driven by Linear Actuators

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Abstract

Wet Wipes Machines are high-tech machines that work at high speeds. In order to reach high packaging speeds, one of the important units that create a bottleneck in the machine is the stacking unit. The capacity of existing systems is limited by waiting times, which also result in machine vibrations during forceful activities brought on by mechanics. A maximum of 150 packages per minute can be produced using the existing stacking unit whereas the expectations are 200–220 packages per minute. Developing a new stack transfer mechanism has been required to achieve higher production speed. In this study, it is aimed to solve the mechanical problems for stacking units and increase the production speed by means of %30.

Kinematic analyzes were carried out to develop the new mechanism and solve the problem. In the first stage, a solution with a con-rod mechanism was developed instead of the existing system. But since a complex and difficult-to-maintain system has formed, the con-rod mechanism was abandoned and another system with a linear actuator was developed and the design was simplified. The newly developed system's assembly time was cut in half compared to the existing system. The usage of linear actuators also offered convenience in adjusting and maintaining. The working speed has increased because waiting periods at dead ends have been eliminated.

Keywords: Machine Design, Wet Wipes, Stacking, Kinematic, Linear Actuators

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Developing of Variable Stroke Mechanism Driven by Double Servo

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Abstract

The wet wipe packaging process involves the process of taking wet wipes in a package and sealing this packaging around stacks of wet wipes. In this context, hot sealing is usually performed for wet wipes. The process of sealing the wet wipe package packaging around the product is provided by a module called the "Jaw Unit". On the existing system, the movement is achieved with the cam mechanism by being driven from a single servo motor by limiting the path followed by the lower and upper jaw groups by spring pressure. But, it is not possible to use the current system for different typed and sized products. To solve the problem, the unit must have variable speeds for different product types and different product sizes. At this point, two different cam systems have been developed under the name of vertical movement mechanism and horizontal movement mechanism with the help of two independent servo motors within the scope of the study.

The developed mechanism has two different movements arising from these two different mechanisms that have been synchronized with the automation software developed. In this way, the system was made available at variable speeds for different product types and different product sizes.

As a result, the developed system has become a high-value-added mechanism that offers better bonding quality, more durability, adjustable to different product sizes (flexible), and increased production speeds.

Keywords: Packaging Machines ,Wet Wipes, Sealing , Jaw Unit , Mechanism

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An Investigation on Term Weighting Methods for Distributed Information Retrieval

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Abstract

In recent years information and facts have become more of a priority than long ago. In addition to technical developments in computer science, the amount of information needed by users has been increasing every day. For the purpose of accessing to the information, IR systems have to do some basic operations such as crawling and indexing before retrieving requested information. The objective of this research is to examine the performance of retrieval on written document collections in terms of term weighting algorithms and score normalization merging techniques in a distributed environment called distributed information retrieval. During this study, an application was developed by using the library provided by Terrier IR platform to carry out the retrieval automatically. Terrier IR Platform is a modular open-source software which was developed by members of the Information Retrieval Research Group at the University of Glasgow. The functions performed by this program are data-sets preparation for tests, indexing, retrieving and performance evaluation. Firstly, an experimental test data has been prepared using text collections in TREC-6, TREC-7 and TREC8 ad-hoc tracks provided by the Text Retrieval Conference. Each test collection is divided randomly into smaller-sized collections. After the indexing process, the necessary data has become ready for the use of test cases in the retrieval stage. The test cases have been created by applying several term weighting methods and normalized merging methods at retrieval stage on each dataset. TF-IDF, BM25, DFIZ and IFB2 are term weighting methods, where Min-Max and Sum are of result merging methods. At last, the performances of tests have been evaluated by the MAP and R-Prec metrics which demonstrate that although IFB2 and DFIZ have higher values in some cases, but TFIDF and BM25 weighting models are still more robust when number of partitions are increasing.

Keywords: Distributed Information Retrieval, Weighting Algorithms, Indexing, Merging Algorithms, Search Engines

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Relief Image Inpainting by Using Region-Wise Convolutions

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Abstract

Archaeological excavations are carried out in many parts of the world and historical artifacts are unearthed. Reliefs are one of the historical artifacts found in excavations in our country and encountered in many museums. Reliefs have been a widely used art, especially in Anatolia, as in many geographies. Some of these historical artifacts that have survived to the present day are intact, while others may have undergone deformation. Deformations in historical artifacts can be caused by many different factors such as human, nature and time. The size and shape of these damages may also vary. The need to access the original non-destructive image of historical artifacts may be due to various reasons. In general, the problem of image inpainting is a problem that is currently studied in the literature with the development of deep learning. In particular, with the development of machine learning methods over time, various methods and techniques have emerged, including this subject. In this study, generative adversarial networks method was used to solve this problem. A relief data set was created by using historical artifacts in three important archeology museums in Turkey. An artificial intelligence model was trained using the relief data set with the image inpainting on a region-wise convolutions. In the experimental studies, the original undamaged relief image and damaged relief images were given as input to the damage correction model and the corrected images were taken as output. The comparison of the original image and the damaged images in the direction of structural similarity index measure was made.

Keywords: Relief, deep learning, image inpainting, generative adversarial networks, structural similarity index measure

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Machine Learning Applications on COVID-19 Pandemic: A Systematic Literature Review

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Abstract

Covid-19 is an infectious disease caused by the Sars-Cov-2 virus, which emerged on December 19, 2019 and was declared as a pandemic by the World Health Organization (WHO) on March 11, 2020. This disease, which causes infection in the lungs and upper respiratory tract, has been seen in more than 243 million people worldwide and spread to 192 countries/territories and 26 cruise/naval ships since the day it first appeared. Studies are carried out in many different areas to combat the increase in the number of infected patients. Computer-aided systems, —one of these areas— are used together with technologies such as data science, machine learning and artificial intelligence, and they provide great benefits in predictive diagnosis processes in the fight against Covid-19. In this study, machine learning methods used for the detection and diagnosis of Covid-19 are investigated by systematic literature method. 49 empirical studies in which machine learning is applied with a model and methodology suitable for the purpose determined as content were examined. In this study, the purposes and performances of using machine learning methods in the field of Covid-19 were examined. The articles between 2019-2021 from two different sources, IEEE and Science Direct, were obtained using five search queries. Using the exclusion and selection strategy among 49 out of a total of 532 studies were examined. Within the scope of the study, it was seen that the most used of the 3 data types, namely time series, image and clinical, was the time series. It has been concluded that among the 3 usage purposes determined for machine learning in the articles, Covid-19 diagnosis is the most studied problem type. While the most used machine learning method for Curve Fitting problems was Regression, it was concluded that Random Forest (RF) and Support Vector Machines (SVM) methods were frequently used in the diagnosis of Covid-19.

Keywords: Machine Learning, Covid-19, Sars-Cov-2, Systematic Literature Review, PRISMA

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Software-Defined Network Application with AI Techniques

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Abstract

This study was carried out to monitor network traffic using software defined network controller. In this direction, Floodlight was used as the controller and Eclipse was used as the working platform. In order to increase the accuracy, packet statistical information was obtained after the follow-ups performed on five different topologies. The desired data sets were created by processing the statistical data on MATLAB. By using these datasets in artificial neural networks using nntool in MATLAB, packet flow at certain times was estimated. Artificial neural networks have been tested on five different topologies and their accuracy has been tested with MAPE and R2 equations. As a result of the tests, optimization processes were applied on the topology with the highest accuracy. For this purpose, optimization tests were carried out with a total of four different optimization techniques: linear search, tabu search, modified tabu search, and a mixture of annealing simulation and tabu search algorithm. As a result, the most intense route was determined in the shortest time as a result of the optimization performed with the mixture algorithm proposed in the study.

Keywords: Linear Search, Taboo Search, Artificial Neural Networks, Artificial Intelligence, Software Defined Network.

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A Content-Based Recommendation System for Online Quiz Contests

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Abstract

An online quiz contest is a competition in which participants are given a series of questions via an application and submit their answers online. These online contests attract the attention of a larger audience because participants can easily access them from any location. At the end of the contest, participants can easily check their results and compare them with other participants. In this study, a content based recommendation system is proposed by using 3 data sets from HQ Trivia Online Contest (Questions, Players, Player Answers). In addition, a player statistics data set is created to represent the success of each player in each question category. A score was calculated considering the duration of the answers given by the players to the questions and their correct/incorrect answers. While calculating the category score of the player, the raw score was computed by scoring +1 for each question answered correctly and -1 for answered incorrectly. This raw score was multiplied by the time average on a 20/category basis and the weighted category score was calculated.

To keep the players in the game more, it is aimed to ask questions to the players in the categories where they are successful. Two different studies were conducted for this purpose. The first study focuses on the implementation of a content-based recommender system, while the other clusters similar players. Both studies were carried out using the player statistics data set. The content-based recommendation approach is the process of making recommendations for the future based on a player's past responses.

The clustering approach is selected based on the assumption that similar players will make similar choices. In the study, 3 different clustering algorithms with were used (K-means, Agglomerative, DBSCAN).

Keywords: Online Quiz Contest, Recommendation, Content Based Recommendation, Clustering, K-Means

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Artificial Intelligence Based Follower Profiling System

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Volkan İLLİK[4]

Abstract

Today, the concept of data is important for every company. Companies rely on data when making investment plans. The reason for this is the desire of companies to use their resources correctly and effectively. If the data are correctly analyzed and interpreted, companies will make it easier for them to make decisions. Today, especially in the social media field, data comes to the fore and has an important place. We can say that all kinds of pictures shared on social media, written texts, and interactions, in general, are data. The number of people using social media in the world and the time they spend on social media is increasing day by day. This increase in the use of social media causes an increase in shared text and image data. This image and text data that is constantly accumulating on digital platforms are called unstructured data. Manually managing unstructured text and image data is quite difficult. Because it is necessary to produce new techniques to automatically make this data meaningful. Within the scope of this project, it is aimed to analyze the followers of the companies on the data (text and image data) produced on social media platforms using artificial intelligence techniques and to analyze the follower profile. In this direction, various companies will be able to recognize their social media followers and make the right advertising strategies according to their target audiences.

Keywords: Object Detection, Text Sentiment Analysis, Topic Modeling, Profiling, Follower Analysis, Natural Language Processing, Deep Learning

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A Hybrid Sentiment Analysis Approach Using Deep Learning and Emojis

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Abstract

Sentiment analysis is an approach that examines the general attitudes of communities toward an issue. It can be used to learn about user satisfaction, emotional attitudes, and ideas about a particular topic. In artificial intelligence (AI), sentiment analysis is a natural language processing (NLP) technique used to determine whether data is positive, negative, or neutral. Numerous strategies, including supervised and unsupervised approaches (machine learning, deep learning algorithms), have been developed in previous research for a variety of sentiment analysis problems. In this study, we develop a hybrid approach for sentiment analysis using a sample dataset of comments on products sold on Boyner's e-commerce website. The dataset consists of 22,734 samples and 7 attributes and contains information such as comments on different products, product rating, and approval status. It also contains 4,739 samples with emojis. To filter out empty comments and those with only one character, these emojis were first placed in a separate column but not removed from the comments. In addition, the character length for each comment and information about how many emojis are added to the dataset in the pre-processing step. Since there are no words with less than three characters in Turkish, comments with less than three characters and zero emoji value were removed from the data set. In the study, a special emoji dictionary was created for Boyner. Negative and positive ratings of emojis were calculated for 78 emojis in the dictionary. To understand how the emojis affect the predictions of the model, the accuracy values were first calculated by making a classification with a pre-trained BERT model over the test data. Then the accuracy values were recalculated using the scores of emojis and the results were compared.

Keywords: Machine Learning, Text Classification, Deep Learning, Sentiment Analysis, Emoji Analysis

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Analysis of Turkiye Pisa Data with Artificial Intelligence Techniques

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Abstract

Education can be said to be the most important factor for the future of society. It is only through a good education that individuals can adapt to the society they are in. Nowadays, many successful applications in machine learning applications are seen and will continue to be seen. In this study, the machine learning approach was applied to science literacy and in addition, the reliability levels of the results determined based on machine learning algorithms were attempted to be determined. The purpose of this study is to measure the success status of individuals in the field of Science in our country. As a result of the results of PISA 2018 based on the Turkish average, the success status of the students was grouped into two different classes (successful / unsuccessful). Different algorithms were used to make this grouping, and the classification performances of the algorithms were compared. Raw data, data cleaning and after applying the normalization process, the resulting dataset WEKA machine learning algorithms with the help of the program determined by using the most efficient algorithm for training through the process of "Naive Bayes" algorithm was found to be. In this study, both the science achievements of students in Turkey in 2018 were analyzed and it was determined which algorithm was the most appropriate in this analysis.

Keywords: PISA, Machine Learning, Classification, Normalization, Data Mining

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Creating and Labelling Invoice Dataset with OCR Based Technologies

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Abstract

As companies grow, their supply chain also expands. This expansion brings with it an increase in the number of invoices. Digitizing and storing physical invoices has become a necessity to facilitate accounting transactions and financial flow analysis. For this reason, a very intensive workforce is needed for the digitization of physical invoices in large companies. Many deep learning and natural language processing projects are being developed on this topic. However, Turkish invoices do not have sufficient size, high accuracy, labeled and ready-to-train datasets for machine learning and deep learning. The aim of this study is to create a ready-to-train, high-accuracy labeled dataset on Turkish invoices. Four different optical character recognition methods were used to extract text from invoice images. These methods are CRAFT (Character Region Awareness for Text Detection)-Calamari OCR, EAST (Efficient and Accurate Scene Text Detector)-Calamari OCR, Google Vision and Tesseract. In order to increase the accuracy of these tools, image preprocessing methods such as background removal, color and resolution correction, noise removal, tilt and angle correction, contrast editing, table and line removal were used. After the applied image preprocessing methods, the highest success was obtained using Google Vision (99.36%). Various correction processes were applied to increase the accuracy of the dataset on the erroneous OCR results. NetBT[1] - New Smart Labeling (NSL) panel was used for data labeling, and a total of 145,000 invoice images were labeled, 112,672 digital and 32,328 paper invoices, using 40 different label units.

Keywords: Data Labeling, Dataset, Image Processing, Invoice, OCR

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Does Hardun Change Colors?: A Preliminary Study on Ventral Color Alterations of Anatolian Harduns

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Abstract

The ventral body patterning in *L. stellio* is seen as spots in some individuals at first glance. The frequency of the spots and the darkness of their colors differ between individuals. In some individuals, the ventral body is completely unspotted and milky white. Previous studies have mentioned the color change of the rock agamas of Eurasia. In addition to the communicative context of this change, they said it was a response to changes in physiological state and the air temperature. However, no color change was reported for the populations of *L. stellio's* distributed in Anatolia. In this study, we showed that these spots on the ventral body indicate a temporary color change. In the five ventrally spotted individuals studied (1 ♂ Hatay Doğu, 1 ♀ Hatay Doğu, 1 ♂ Konya, 1 ♂ Manisa and 1 ♂ İzmir) we found that the spots disappeared in an average of 7 minutes. That is, individuals changed the color of the ventral body during the examination period. And in about 7 minutes, the body has taken on a completely spotless, milky white appearance. Accordingly, ventral body patterning should not be considered a permanent morphology and should not be evaluated as a distinctive character in intra- or inter-population studies. Further studies of this phenomenon in the future will provide new insights into the physiology of color change in Harduns and under what conditions it occurs.

Keywords: *L. stellio*, color change, Anatolia, ventral, Hardun

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The Investigation of *Legionella* Bacteria Coinfection among Hospitalized Patients with COVID-19

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Abstract

Covid-19, caused by the SARS-CoV2 virus, is a viral infectious disease with high mortality and morbidity rates with many variants nowadays. It has been determined that other pathogenic bacteria, especially *Legionella* bacteria, can cause coinfection and suppress the immune system in patients infected with this virus, which causes severe acute respiratory failure. *Legionella* bacteria that cause Pontiac Fever and Legionellosis infect the lung by attaching to alveolar macrophages by inhalation from air conditioning and man-made water systems. Recent studies have shown that two infections with similar symptoms increase morbidity and mortality rates when experienced simultaneously. On the other hand, since Covid-19 is a viral infection, antiviral agents used in the treatment cannot be used in the treatment of secondary infections caused by *Legionella* bacteria. For this reason, the source of the secondary infection (bacteria, virus, fungus, parasite) should be found first and treatment should be applied to the agent. In this study, other studies with patients diagnosed with Covid-19 by PCR will be examined and the proportions of patients who have been confirmed to have secondary infection with *Legionella* bacteria by molecular methods and urinary antigen testing will be determined. Thus, it is aimed to raise awareness that patients with Covid-19 who do not respond to treatment should also be evaluated in terms of secondary infections caused by *Legionella* bacteria. It is thought that identifying the patients with secondary infection and treating them without losing time will contribute to other epidemiological studies as it will reduce the mortality and morbidity rates.

Keywords: Covid-19, coinfection, *Legionella*, morbidity, mortality.

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Medical Secretaries and Their Problems in the COVID-19 Pandemic

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Abstract

The COVID-19 pandemic, which started in 2019 and spread quickly to the world, has undoubtedly influenced health workers. Health workers are included in the professional group with high risks in pandemics. Since COVID-19 is a virus that is transmitted through droplet and contact, it is necessary to be more than 1 meter away from infected people. However, health workers can hardly give remote care to the patient. In particular, medical secretaries are seen as the first contact with patients and their relatives. For this reason, their working motivation is expected to be high and they are supposed to have good relationships with patients. However, this professional danger, which is exposed to medical secretaries, exposes them to excessive stress, which affects them psychologically in the long term.

During the process of ongoing pandemic, which has been going on for about two years, more workload and long working hours are confronted with the risk of constant infection. It is important that medical secretaries protect themselves first and then establish the correct relationship with patients. If high quality, safe and efficient health service needs to be provided, the working environments and conditions of the medical secretaries must be appropriate and sufficient for occupational safety. Otherwise, this may disrupt the health of the secretaries, make their jobs difficult and have negative consequences for patients.

Research shows that coping with pandemics depends on mentally and physically strong health personnel. It is seen that the problems of the medical secretaries who first contacted patients and their relatives were ignored in this process. In this study, it is aimed to draw attention to the risks and problems faced by medical secretaries and to offer solutions.

Keywords: Medical secretary, COVID-19, Pandemic

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Digital Health Literacy in the COVID-19 Era

Hazan SOYKAN[1]

Abstract

The world has to keep pace with change and developments in technology. As in every field, technological developments have advanced in the field of health and digital health literacy has gained importance. In the rapidly advancing COVID-19 epidemic, people have conducted research on digital channels in order to learn about the disease, prevent it, and try to understand how it spreads. A lot of right and wrong information has been shared on various web-based platforms across the country and the world. Increasing interest in online information puts individuals in difficult position finding the right information in a large knowledge pool.

The information pollution on the internet in the last period, when health has become more important, and the fact that there are false information that is far from science, shows the importance of digital health literacy that should be done correctly. These sources, which misinform the public, seem to be quite dangerous for public health. The broad public reach of the Internet and social media facilitate the spread of rumors and unreliable information. The overabundance of information threatens humanity and makes it difficult to seek scientifically proven facts. These health contents, which inform the societies, should be easily accessible, understandable and appealing to all segments of the society.

The ability of people to search for information, review and make decisions about their health through electronic platforms is called digital health literacy. People need to have the skills to process and filter this information in order to navigate through these information environments and make correct health decisions. The aim of this study is to emphasize the importance of digital health literacy, to make suggestions for its improvement, to draw attention to the problem of information pollution during the pandemic and to offer solutions.

Keywords: Digital health literacy, COVID-19, Pandemic

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Iron-related Proteins, Cancer and Immun Regulation

Ece ŞİMŞEK[123]

Abstract

Iron is one of the most important elements for all known terrestrial life forms. Iron, which plays a key role in many important biological functions, is closely related to several different proteins responsible for entry into the cell, exiting the cell, interstitial circulation, and storage, and is regulated by these proteins, which called iron-related proteins. Disruption in iron regulation is associated with many diseases, especially cancer. The connection between the formation of reactive oxygen derivatives and iron carries iron to a different point from other elements in terms of almost all cancer types.

Deterioration in iron hemostasis is also closely related to diseases of the nervous system, cardiovascular system and hematological system. However, multiple system disorders such as infection, cancer and aging are thought to be associated with iron hemostasis. Another important point is that iron hemostasis affects both innate and acquired immunity. Recent studies indicate that targeting iron metabolism may be one of the potential treatment strategies for immune-related diseases. For this reason, it is thought that the results of studies that will investigate the connection between iron mechanism and immune regulation will be very important in terms of both clinical and basic sciences.

Inflammatory cells in the tumor microenvironment and inflammatory factors released from these cells, tumor cells; It promotes escape from the immune system, tumor angiogenesis, epithelial-mesenchymal cell changes, and escape from apoptosis.

Clinical and epidemiological studies have shown a strong relationship between chronic infection, inflammation, inflammatory microenvironment and lung cancer. It is thought that elucidating the molecular mechanisms of the relationship between inflammation and lung cancer will pave the way for the identification of new therapeutic targets.

This study aims to give brief information about the iron-related proteins and their importance in cancer.

Keywords: Iron; Iron-Related Proteins; Cancer; Lung Cancer; Immun Regulation

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Scavenger Receptors and Its Importance In Cancer

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Abstract

The scavenger receptor superfamily represents a diverse group of evolutionarily conserved receptors known to play important roles in host homeostasis. Scavenger activity is associated with the ability of some membrane receptors to bind to and internalize oxidized low-density lipoprotein. ,

Scavenger receptors are structurally very heterogeneous. They fall into many different classes, and although members of each class share some structural features, there is little or no homology between the classes. Functionally, they have many different roles and can bind to different ligands.

Similar to other pattern recognition receptors, scavenger receptors have a central role in innate immunity.

SCARA5, a Scavenger A class member, is the latest addition to the Scavenger receptor family. SCARA5 is a 495 amino acid single-pass transmembrane receptor glycoprotein. Unlike other family members found mainly in macrophages, SCARA5 is widely expressed in various human tissues such as bladder, ovary, kidney, testis, adrenal gland, skin, and trachea. Recent epigenetic studies also suggest that SCARA5 gene may be a novel tumor suppressor gene. SCARA5 first comes into contact with in the cell is Focal Adhesion Kinase (FAK). It is known that the intracellular molecular signaling pathway starts with the phosphorylation of the FAK/Src/Cas complex and triggers many different mechanisms responsible for the aggressiveness of the tumor such as the viability, proliferation, motility of cancer cells, maintaining the cell cycle, angiogenesis, metastasis, and epithelial-mesenchymal transformation. The most recently identified role of SCARA5 was demonstrated in a study with renal cells in transferrin receptor I knockout mice. No iron deficiency was observed in these cells, which lack transferrin receptors. On the contrary, abundant iron was detected in the cell. Therefore, the source of iron taken into the cell is defined as Ferritin, which is taken into the cell as a result of the interaction of the SCARA5–Ferritin complex.

Keywords: Scavenger Receptor, SCARA5, Ferritin

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Tuberculosis and Macrophage Relationships

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Abstract

30% of deaths. Increasing resistance problems against drugs used in treatment necessitate the discovery of new drugs and the development of alternative strategies.

Macrophages; It is one of the main immune cells of our body in the fight against diseases. However, Mycobacterium tuberculosis, the causative agent of tuberculosis, has developed resistance to the elimination mechanisms of the pathogen, which is the main task of the macrophage.

Transmission of M. tuberculosis bacillus occurs by breathing in contaminated droplets released from the lungs of an infected individual. Infected cells release proinflammatory cytokines and other immune cells assemble here to form granulomas, the pathological feature of TB. Granulomas formed by activated T lymphocytes and macrophages limit the proliferation and spread of the bacillus. The necrosis environment prevents the progression of the disease by stopping the proliferation of mycobacteria, and thus the bacillus enters the stationary phase. The interaction between M. tuberculosis and the host macrophage is essential in determining the outcome of infection.

The interaction between M. tuberculosis and the host macrophage is essential in determining the outcome of infection. How TB impairs the macrophage response originally designed to kill is still not fully understood. Following the uptake of the bacillus into the macrophage by phagocytosis, the phagosomal maturation process begins.

A phagolysosome is formed with a highly oxidative, acidic and degrading environment designed to eliminate bacilli. It is important to elucidate the mechanisms responsible for inhibition of phagosome maturation to prevent bacillus proliferation.

To prevent dormancy in macrophage and to develop treatment strategies, it is necessary to understand the virulence mechanisms of M. tuberculosis and to focus on the survival and proliferation pathways of the bacillus within the host macrophage by impairing the host's immune response.

Keywords:

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Mycobacteriophages in the Treatment of Tuberculosis

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Abstract

Tuberculosis is second only to COVID-19 in terms of deaths from a single infectious agent. According to the report WHO, *Mycobacterium tuberculosis,* which infected 9.9 million people in the world in 2020, threatens public health with the emergence of multi-drug resistant (MDR-TB) and extensively drug-resistant (XDR-TB) strains. The increase in the rate of resistant strains has necessitated the discovery of new antibiotics and drug targets and the development of alternative treatment regimens. "Phage Therapy", which attracted attention when it was first discovered, but remained in the background with the discovery of new antibiotics, has now taken into account its place again with the emergence of antimycobacterial resistance. Of these, mycobacteriophages are the group of phages that infect only mycobacteria. Although the life cycles of the host bacteria continue as lytic or lysogenic, the relationship between them results in the lytic activity of the phage and ultimately the degradation of the host. Their lytic activities make them important therapeutics in the treatment of mycobacterial infections. Mycobacteriophages exhibit lytic activity on both extracellular and intracellular *M. tuberculosis* when prepared and administered as a cocktail, either alone or combined with other phages. Mycobacteriophages are currently used in the diagnosis of tuberculosis and drug susceptibility tests. Although there is no clinical case study for their therapeutic use, *in vitro* and *in vivo* studies draw attention to the important therapeutic potential of mycobacteriophages for their future clinical use. The Food and Drug Administration (FDA) has approved the Center for Innovative Phage Applications and Treatment (IPATH) in San Diego to use phage therapy as an experimental treatment through the "Emergency Research New Drug" scheme. The center is in high demand for personalized treatments for patients infected with other mycobacteria other than *M. tuberculosis.* These innovative steps are promising in the treatment of tuberculosis patients soon.

Keywords: Mycobacteriophage, *Mycobacterium tuberculosis*, Phage therapy, Tuberculosis, Antimycobacterial resistance

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Plant Active Ingredients and Aging

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Abstract

People have been using plants for the prevention and treatment of diseases since the first time they existed. Especially after the 1990s, the discovery of new areas of use for aromatic plants and the increase in demand for natural products have increased the interest in plants. Although the use of plants for medicinal purposes is more common in societies in Far East countries, it is seen that the habits of using medicinal plants have increased in western societies.

Flavonoids derived from plants are plant bioactive compounds that are of great interest in nutrition and pharmacology due to their extraordinary properties such as antioxidant, anti-inflammatory, antibacterial, antifungal, and antitumor drugs. There are more than 5000 flavonoids in nature, with enormous structural diversity and many interesting pharmacological properties.

During the aging process, many irreversible changes occur in our bodies. Although oxygen molecules are indispensable for life, they form highly reactive intermediates, known as free radical sources, during metabolism. One of the important effects of reactive oxygen and nitrogen derivatives formed during metabolism is to cause damage to DNA, RNA, lipids, and proteins.

The increase in free radicals may increase the susceptibility to many diseases, from gastrointestinal diseases to infertility, cardiovascular diseases to respiratory and excretory system disorders, as well as aging. Antioxidants neutralize free radicals and protect cells from this damage. For this reason, to prevent aging and diseases that are directly related to free radical levels and antioxidant use, it should be ensured that oxidant substances are in balance with antioxidants.

With a balanced diet and adequate antioxidant intake, it may be possible to get rid of the negative effects of free radicals. Therefore, antioxidants can be recommended as an important defense mechanism for delaying oxidant-induced aging, reducing the risk of diseases, and for a better and longer life.

Keywords: Anti-aging, Flavonoids, Free radicals

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Comparison of the Results of Two Consecutive Separate Learning Periods in Minimally Invasive Unicondylar Knee Replacement

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Abstract

The aim of this study was to evaluate the learning curve of this surgical application by comparing the results of MIUKDP (Minimal invasive unicondylar knee prosthesis) performed by the same orthopedic specialist between 2007-2013 and 2013-2019.

Age, gender VAS, KSS of 53 female 19 male 72 MIUKDP (1st group) applied between 2007-2013 and 84 MIUKDP (2nd group) applied between 2013-2019, 61 female 21 male results were compared. Component compatibility of the femur (varus-valgus flexion-extension angle) and tibia (varus-valgus, inclination angle) was evaluated using the Oxford group radiological evaluation criteria. The clinical reflection of these radiological results was evaluated. The duration of surgery, amount of bleeding, and infection rates were compared. SciPy v1.2.3 was used for statistical analysis.

There was no significant difference between age and gender of both groups (P=0.184). There was a significant difference between VAS and KSS before and after surgery in both groups (p<0.05). There was no significant difference between the preoperative VAS and KSS between the two groups (p=0.347), but there was a significant difference between the postoperative VAS and KSS in favor of the 2nd group (p<0.05). According to the Oxford group radiological evaluation criteria, there was no significant difference between the two groups. There was a significant difference in favor of the 2nd group in the duration of the operation (p<0.05) and the amount of bleeding (p<0.05).

The MIUKDP learning curve was long. As the number of cases increased, significant improvement was observed in the amount of bleeding, VAS and KSS. There was a significant difference in favor of Group 2 in the duration of the operation and the amount of bleeding.

Keywords: Knee, Minimally invasive, Unicondylar, Prosthesis, Learning

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Bioactive Components in Foods and Health Relationship

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Olcay BOYACIOĞLU[2]

Abstract

In recent years, the food industry has been making great efforts to develop more nutritious and healthier foods, especially during the epidemic. The fact that bioactive components in plant-based foods have been extensively studied in recent years is due to the discovery of their close relationship with human health, and it is supported by epidemiological studies showing that they reduce the incidence of new cases, especially in cancer. Although bioactive compounds are generally considered as non-nutrients, they are very important compounds for human nutrition, and there is scientific evidence that plant-based diets rich in fruits and vegetables protect against cancer. In particular, it has focused on the discovery of new antimicrobial agents related to microbial resistance, which has become an increasing problem for human health, and many studies have been conducted on the antimicrobial activity of bioactive components. Due to the intense interest of consumers in energy-enhancing, anti-aging, health-enhancing and relaxing products, supporting food products with bioactive compounds provides an increase in consumer preference in terms of obtaining products with additional biological properties. The newly developed bioactive compounds are preferred by food companies as they provide product privilege with patent protection and contribute to the reduction or reuse of industrial residues.

Keywords: Bioactive, polyphenols, phenolic compounds, health, anti-cancer

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Structural Characterization and Migration Properties of Commercial Lacquers Used in Cans

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Abstract

Ensuring the safety of packaging materials in contact with food in the production, distribution and sale of foods, determining the effect on food quality/safety and defining the health risks arising from these materials are important in terms of protecting consumer rights. Some substances included in the structures of packaging materials and/or added during their production can pass into foods and reach levels that harmful for human health. This substance transition is called migration and there are international migration limits defined for all components that have a risk of transition from different material groups. Tin cans made of metal-based materials are used in the food industry for the packaging of canned food, dairy products, vegetable oil and dry foods. The surfaces of the tin cans that come into contact with food are covered with organic coatings called lacquer, which vary in durability according to the characteristics of the food placed inside. Thanks to the synthetically produced lacquers, chemical reactions are restrained by preventing the interaction of the food with the tin steel. However, there is a risk of transition from these polymeric-based organic coatings to foods. Some visual and sensory problems arise in the sector due to technical reasons such as the quality, thickness and application conditions of the coating materials used in the coating of tin can surfaces. In this study, the risks that may arise from technical and structural reasons as a result of the tin can coming into contact with food were investigated. Structural characterization of tin cans supplied from different companies and in different types of lacquers was examined by FT-IR and it was found that they were generally epoxy phenolic lacquers. The total migration analysis results were found above the detectable levels in the samples, but the legal limits were not exceeded. Phthalate esters analysis results could not be determined, BADGE and BADGE derivatives were found to be detectable in epoxy derivatives analysis, the results did not exceed the limits of the legislation. BFDGE and BFDGE derivatives and NOGE derivatives could not be detected.

Keywords: Lacquer, migration, epoxy derivatives, phthalate, FT-IR

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Investigation Into the Migration Potantial of Fluoropolimers Coating Materials from Pans

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Semra ÇAVUŞ[8]

Abstract

For the protection of consumer rights, safety of food contact materials, which is the final chain from farm to fork, must be ensured and determination of their effects on food quality as well as any description of health risks arising from these materials should be established.

These obligations are stated in the Regulation of Food Contact Materials and Articles (Turkish Food Codex) as follows; "Migration from food contact materials to food cannot occur in the amount which could endanger human health or results in unwanted changes on food composition or its sensory properties".

However, chemical substances found in the structure of food contact materials and/or added while their manufacture may contaminate food and their amount can reach up to heights which are harmful to human health. Contamination of these chemical substances is described as "migration".

In this project; It is aimed to determine the effects on food quality and safety by examining the label information, structure determination analysis and composition, total and specific migration analyzes (metal, BPA, PFOA, PFOS) of PTFE coated pans and residue levels that can pass into food.

In the project; the effects of PTFE coated pans on food quality and safety were determined by examining the label information, structure determination analysis and composition, total and specific migration analyzes (metal, BPA, PFOA, PFOS) and residue levels that can pass into food. A total of 288 samples with a diameter of 24 cm were collected from 12 domestic and imported companies coated with fluoropolymer from the market. A total of 12 types of containers containing fluoropolymer coating materials collected from the markets were washed according to the label information, rinsed with distilled water, dried, and stored under laboratory conditions until analysis. The results obtained were evaluated statistically and it was determined that they were within the legal limits.

Keywords: Migration, food contact material, pan, fluoropolimer, PFOA, PFOS, BPA, metal, FTIR, LCMSMS, ICPMS

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Method Validation of Photoinitiators That can Migrate from Printing Inks to Food by GC-MS

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Abstract

Photoinitiators are highly photoactive compounds included in the formulations of UV curing printing inks. UV curing ink is a mixture of preolimers (oligomers), monomers, pigments (colourants) and highly reactive compounds called as photoinitators. Absorption of light in the range of appropriate wavelength and intensity by photoinitiators lead to polimerization reaction by which the liquid form is converted into the solid one. However, the residues of photoinitators in packaging materials can migrate into the packaged food. Migration is the transfer of chemicals from food contact material into food. The transfer of photoinitiators from food contact material into food can occur by different mechanisms (set-off, permeation and indirect mass transfer through gas phase). In addition, if the paper or board material made from recycled fibers has been previously printed with UV printing inks, the photoinitiators may be present in the packaging. The effects of packaging materials produced with the photoinitiators can pose a significant risk on food quality and safety. The purpose of the work discussed in this paper is to investigate in detail the migration of photoinitiators that can occur from paper and flexible plastic materials printed with UV curing inks and the photoinitiators (BP (Benzophenone), 4-MBP (4-Methylbenzophenone), ITX (2-Isopropylthioxanthone), EDAB (Ethyl-4-dimethylaminobenzoate), HCPK (1-Hydroxycyclohexyl-phenylketone), EHDAB (2-ethylhexyl-4-dimethylaminobenzoate)), which are frequently encountered in the literature, method validation was performed with gas chromatography - mass spectrometry (GC-MS) and method validation parameters were evaluated.

Keywords: Food packaging, GC-MS, migration, photoinitiators, printing inks.

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Usage of Date Powder as Sugar Substitute in Food Industry

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Abstract

The problem of obesity has become widespread due to the consumption of sugar and sugary products depending on the consumption habits around the world. Therefore, sugar substitutes are used in food products to reduce calories. One of the ingredients used for this purpose is date powder. Date powder is a component that has attracted attention recently because it is rich in protein and dietary fiber and contains copper, selenium, magnesium and potassium minerals. When the studies about the use of date powder as a sugar substitute in various food products are examined studies related with chocolate, cake, milk desserts, rock donuts, ice cream and biscuits have been encountered. In these studies, it has been determined that 40% chocolate can be substituted in milk desserts and biscuits, and up to 50% sugar substitutes can be made in donuts and cakes. Some problems related with usage of date powder have been observed such as weak gel structure in milk desserts, decrease in the rate of swelling in cake, acceleration of melting in ice cream, taste and color deterioration in biscuits due to Maillard reaction, taste changes in products that are not dominant due to their characteristic taste, and color problems in light-colored products due to darker color of date powder when compared with sugar. With the use of date powder in dark colored products with a dominant taste, taste and color related problems can be prevented, while problems such as swelling problem, weak gel structure and fast melting are improved by using different additives. As a result, the nutritive values of the products can be increased without destruction of quality properties by using date powder instead of sugar substitute.

Keywords: Date powder, sugar substitutes, sugary products

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Turkey's Geographically Indicated Yogurt Varieties

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Abstract

The "geographical indication" system created by the European Union aims to prevent the wrong and unfair use of the names of products with certain characteristics and to introduce the product properties to the consumers correctly. In other words, traditional products produced only in certain regions are protected by legal regulations. The importance of geographical indication in Turkey is being better understood and the number of geographically indicated products is increasing each day. While the number of geographically indicated products in Turkey was 306 in total in 2018, this number increased to 1247 in just 5 years. In addition, the number of geographically indicated dairy products increased from 13 to 55 in the same period. Although yogurt is perhaps the most consumed product among dairy products, until 2020, there was no yogurt variety registered with geographical indication, while today there are 9 geographically marked yogurt varieties belonging to different regions of Turkey. These products are Afyon Buffalo Yogurt (Afyon Manda Yoğurdu), Antakya Salty Yogurt (Antakya Tuzlu Yoğurdu), Emirdağ Sheep Yogurt (Emirdağ Koyun Yoğurdu), Ereğli Sheep Yogurt (Ereğli Koyun Yoğurdu), Eşmekaya Yogurt, Mamak Ravak Yogurt, Silifke Yogurt, Silivri Yogurt and Çaycuma Buffalo Yogurt (Çaycuma Manda Yoğurdu). In this study, the production methods and unique characteristics of Turkey's geographically indicated yogurt varieties were compiled.

Keywords: Dairy, geographical indication, geographically marked product, traditional product, yogurt

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Traditional Dolaz Cheese

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Abstract

Turkey is a very rich country in terms of traditional cheese variety although many of them are unknown. One of them, Dolaz cheese, is a traditional whey cheese produced by the nomads around the Lakes Region of Turkey for centuries. The product has a soft texture, yellowish-light brown color, a characteristic odor and flavor. It is produced by boiling the whey (optionally mixture of whey/milk or whey/yogurt) for a long time (approximately 10-15 h) and whey is added as the amount of raw material decreases until a yellowish-light brown viscous curd is obtained. After the heat treatment, the curd is cooled and transferred to cloth bags, and a weight is placed to remove the whey. It is suppressed by being turned upside down for 3 days, then it is transferred to a hairless goat-skin bag called "akderi" and kept in cool rooms up to 3 months. In addition, it is optionally mixed with butter when transferring the product to the goat-skin bags. Dolaz cheese is mostly produced in spring and is consumed during the winter time. Although the product is not produced very often today, it is still produced on a small scale in some houses in the Lakes Region. In this study, the production method and characteristic properties of traditional Dolaz cheese, which is one of Turkey's traditional dairy products that have sunk into oblivion, were compiled.

Keywords: Cheese, dairy product, Dolaz, traditional production, whey

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Synthesis and Investigation of PEG incorporated Cu²⁺- Alginate Gels for Medical Uses: Hemolytic Potential and Antibacterial Properties

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Abstract

In this study, copper (II) cations (Cu^{2+}) were used as divalent crosslinking agent for the synthesis of Cu-alginate and polyethyleneglycol (PEG) incorporated Cu-alginate beads. Cu-alginate and Cu-alginate-PEG beads were synthesized at room temperature in presence of varying amounts of PEG following the internal gelation method which allows more uniform gels. The synthesized alginate beads were homogeneous in their dimensions. The structural properties of the obtained beads were investigated depending on the PEG and Cu^{2+} ion concentrations. In the determination of antibacterial properties, E.coli was preferred as the model microorganism in terms of its prevalence in common living areas. It was also determined that the antibacterial activity, which was more clearly observed in alginate gels cross-linked with $0.06M$ Cu^{2+}, decreased with increasing PEG content. The ability of Cu-alginate gels to cause erythrocyte lysis was determined by hemolysis assay. Hemolysis assay, which was performed by using both dry and swollen beads, revealed the promoting effect of increasing PEG concentration on the hemocompatibility of Cu-alginate-PEG gels. For all alginate beads prepared at $0.03M$ Cu^{2+} concentration, blood compatibility was higher than those prepared at $0.06M$ Cu^{2+} concentration. In addition, hemolysis rates were below 5% for all alginate spheres synthesized at $0.03M$ Cu^{2+} concentration and in the presence of PEG (0.5 g/50ml or 1.0 g/50ml). In addition, the pH-dependent dynamic swelling process of Cu-alginate gels was also followed, and it was observed that the gels crosslinked with $0.03M$ Cu^{2+} in the presence of 0.5g/50ml PEG had the highest pH sensitivity.

Keywords: Alginate, Copper, pH-sensitivity, Deswelling, PEG.

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Investigation of the Solubility of Calcite By-Product in the Colemanite-Carbonic Acid Reaction

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Abstract

Colemanite which is the most abundant boron mineral in Turkey is used as boron source in boric acid production with the use of sulfuric acid. Novel methods have been investigated to replace sulfuric acid which causes corrosion in the reactor, dissolves side minerals which causes accumulation of impurities in the product. Although Colemanite-CO2 reaction is a good alternative way of traditional process, the boric acid produced is not in the desired purity. While technical grade boric acid is used in areas such as ceramics and glass, ultra-pure boric acid is used in products with high added value such as nuclear power plants, Thin Film Transistor(TFT). The most important impurity that goes into solution in the production of boric acid from colemanite with CO2 is calcium coming from CaCO3. The aim of this study is to investigate the behavior of CaCO3 in boric acid solution at different concentrations, different temperatures and times. 3 variable Box-Behnken experimental design have been used in the investigation. The amount of Ca++ in an aqueous phase was determined by Atomic Absorption Spectroscopy. When the Ca++ values in boric acid were entered into the Design Expert program and the values were optimized, the minimum dissolution was found at 50oC temperature, 8.26% boric acid amount and 38.69 minutes.

Keywords: CaCO$_3$ solubility, boric acid, colemanite, purity

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Potential Activated Carbon Material For Aqueous Zn-Ion Hybrid Supercapacitor By Using Turkey's First Domestic And National Hemp Plant

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Tuğba Bolat Maden[4]
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Abstract

In terms of sustainability and economy, biomass sources is of great importance in the fabrication of the carbon-based cathode materials that are used in energy storage systems. In this study, Turkey's first registered local and national cannabis plant was used as a biomass source for the fabrication of the activated carbon cathode material. A three-stage activation procedure was used for the production of the activated samples. The process steps from the biomass to he activated carbon are hydrothermal, pyrolize, and activation with KOH. We investigate how the activation procedure influences the texture (by N2 physisorption), the morphology (by Scanning Electron Microscopy and Energy Dispersive Spectroscopy), the structure (by X-ray Diffraction, Thermal Gravimetric Analysis) and the surface properties (by Fourier transform infrared spectroscopy) of the carbon cathode materials. Moreover, Cyclic voltammetry and Galvanostatic charge-discharge experiments were performed for the electrochemical characterization. For the electrochemical characterization, the role of the different electrolytes and the diffision coeffision for Zn^{2+} ion in the aqueous electrolytes were examined through the scan-rate measurements.

Keywords: Zn-ion hybrid capacitor, Hemp, Electrochemical Characterization, Activated carbon

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Synthesis and Characterization of Natural Polymer-Based Dressing by Wet Spinning Method

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Abstract

In this study, a composite hydrogel based on, by introducing, polyvinyl alcohol(PVA), sodium alginate(Alg), pomegranate oil and pelargonium graveolens oil was fabricated using CaCl2 as a crosslinker. In other words, it was aimed to produce effective antimicrobial, antifungal and antibacterial wound dressings by combining polymers used in the medical field with the pelargonium oil and pomegranate peel extracts obtained from plants in our country by using wet spinning technique. Synthesized microfiber-based biodegradable wound dressing polymers were modeled after absorption experiments were performed. As a result of the data obtained, the best strong fiber were obtained with 1:2 volume Polyvinylalcohol/Sodium Alginate (PVA/Alg) mixture, 6% CaCl2 coagulation bath and 3 cm/sec feed rate. The percentage swelling rate was found to be 1280%. The statistical indicators (determination coefficient, root mean square error and chi-square) showed that Peleg model were the best ones to describe the absorption or swelling kinetics. In addition, the structures and morphologies of the same materials were investigated by Fourier Transform Infrared Spectroscopy (FT-IR) and Scanning Electron Microscope (SEM). As a result, the production of completely natural and environmentally friendly, functional natural polymer fibers with superior properties for use in wound dressing sector applications has been successfully carried out.

Keywords: Wound dressing, polyvinyl alcohol, sodium alginate, pomegranate, pelargonium

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Comparison of Morphologies of Raw and Tempered Din 41cr4 and 30mnb4 Steels

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Sefer GÜLEKEN [2]

Abstract

In this study, the differences between the microstructure of the raw sample and the microstructure formed after the tempering process of 41Cr4 and 30MnB4 low alloy steels were investigated. Both materials were first annealed and homogenized at 860°C for 1 hour and 15 minutes in a continuous heat treatment furnace and then cooled in 65°C Petrofer brand, ISOMAX 169 product code oil. The samples, whose heat treatment processes were completed, were made suitable for morphological examinations by cutting disc-shaped pieces with wire erosion. After the heat treatments, sections were taken from the samples and metallographic samples were prepared. Microstructures of polished and etched sample sections were examined by scanning electron microscope (SEM). The elemental composition of the phases was determined by EDS examinations. Subsequently, phase structures, morphological formations and some elemental differences corresponding to these morphological formations were determined. The results obtained for both materials were compared with each other and with the results obtained in the raw samples. As a result, in this study, the morphological structure of 30MnB4 steel, which is cheaper as an alternative to DIN 41Cr4 (AISI 5140) and DIN 42CrMo4 (AISI 4140) steels, which are widely used in the production of wheel bolts in the industry, was investigated.

Keywords:. 41Cr4, 30MnB4, Microstructure, Metallography.

Boronizing and Some Physical Properties of White Cast Iron

Tuna AYDOĞMUŞ[1]

Abstract

In this study, the effect of boriding on white cast iron (Ni-Hard4) was investigated. Box-boriding was chosen as the boronizing method. A mixture of SiC, KBF_4 and B_4C powders with 99.9% purity and micron size was used as boronizing material. The component ratios of the mixture were determined as 90% SiC, 5% KBF_4 and 5% B_4C. These mixtures were obtained in a mixing machine designed in the study, at room temperature, at 15 rpm for 2 hours. Boriding temperature was kept constant at 1000°C and the time parameter was applied as a variable. In the experiment, which was carried out in 2, 4, and 8 hours, a heat treatment furnace was used, which we can raise the temperature in a controlled manner. The temperature was maintained at a constant value. After the surface cleaning and etching processes of the samples obtained, microstructure examinations were carried out with SEM (Scanning Electron Microscope). Morphological examinations were carried out by carrying and hardness tests of the samples, which were subjected to the mounting process. Thus, the results of boriding process were obtained and the results were compared with each other. It was then interpreted by comparing it with the literature. As a result, a study emerged in which the properties of the Ni-Hard4 material improved.

Keywords: Boronizing, Powder Metallurgy, Hardness.

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Investigation of the Effect of Pressing Temperature on Abrasive Wear Properties of Al-Sic Powder Metal Composite Material

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Abstract

In this study, powder metal composite material was produced by hot pressing method using atomized aluminum powder under 200 μm and 99.97% purity and SiC powder under 16 μm. Aluminum and SiC powders were mixed for two hours in a turbula device containing 10 mm diameter steel balls. Then, a powder metal composite block sample of 32x52mm was produced from the mixed powder by hot pressing. The hot pressing process was carried out in a one-way axial steel mold under 200 MPa pressure for 2 hour at varying temperatures (500, 520, 540, 560 and 580 °C).

Density and hardness measurements of the powder metal composite sample produced under the same time and pressure but at different temperatures, and dry shear abrasion tests after metallographic examination were carried out. Cylindrical samples obtained by cutting 8 mm diameter and 14 mm length from block pieces by wire erosion method were subjected to abrasion tests in Pin-on-disc device. Abrasion tests were carried out on Hardox steel discs with a hardness value of 52 RHc under varying loads (5-10-15 N) and at 2000 m sliding distance. The microstructure images taken from the samples showed that the SiC particles as reinforcement elements were homogeneously dispersed in the Al matrix structure, and the targeted sintering was achieved by diffusion on all temperatures, while density values above 98% were achieved. While some improvement is seen in the wear properties of the composite material due to temperature change, it is seen that the hardness values have increased by more than 80% compared to the matrix material.

Keywords: Powder metallurgy, Hot pressing, Composite materials, Mechanical properties

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Investigation of Microstructural and Corrosion Properties of Al-Zn and Al-Cu Alloys Solidified at Different Cooling Rates

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Süleyman Can KURNAZ[4]

Abstract

In this study, 2.5%, 5% and 7.5% by weight percent copper and zinc were added to pure aluminum (Etial A7) and poured into a steel permanent mold with different cross-section thicknesses, known as wedge mold in the literature. The samples extracted from the 15 and 25 mm cross-sectional of the wedge-shaped piece obtained after casting were characterized by using optical microscope (OM), scanning electron microscope (SEM), energy dispersive spectrum (EDS), respectively. In addition, Vickers hardness values of the samples were measured. Also potentiodynamic polarization test was carried out in 0.5M NaCl solution. The findings show that zinc added to pure aluminum precipitates at the grain boundaries, while copper appears with intermatalic structures at the grain boundaries. On the other hand, it was determined that these grain boundary phases increased with increasing zinc and copper in pure aluminum, but a more homogeneous and refined distribution was observed in the thin sections of wedge mold with different section thicknesses. According to the hardness test results, it was observed that the Vickers hardness values increased by 10% on average with the narrowing of the section thickness, that is, the increase in the cooling rate. According to the potentiodynamic polarization test results, it was observed that pure aluminum was the sample with the highest potential value, that is, the most noble and the lowest current density. While there was a decrease in the corrosion resistance of the alloy with zinc and copper added to pure aluminum, it was determined that this situation was higher in the copper added sample. However, among the samples taken from different sections, it is understood that the corrosion resistance of the samples taken from the thin sections are better than the samples taken from the thick sections. This is thought to be due to the fact that the secondary phases dispersed in the microstructures of the samples extracted from the thin sections are more homogeneous and refined.

Keywords: Aluminum, Al-Zn, Al-Cu, Microstructure, Hardness, Corrosion

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Powder Metallurgy Production of Ground and Unground RHA Reinforced AA7075 Matrix Composites

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Abstract

Composite materials are new materials that gain new features by combining two or more materials in a macro dimension to form a single material with the desired properties, and it is referred to as RHA rolled homogeneous armor steel due to its low carbon content. It provides properties such as high toughness (high energy absorption), weldability and strength. Composite materials consist of two components. These components are matrix and reinforcement material. Matrix material is defined as polymer, metal or metal alloy, ceramic-based materials. According to the type, it is classified as Plastic (Polymer) Matrix, Metallic Matrix and Ceramic Matrix. Reinforcement materials are steel, carbide, aramid and nylon. Matrix materials are classified as Particle Reinforced Composite, Fiber Reinforced Composite, Layer Composite and Filled Composite according to the shape of the structural component..In the prepared study, it is aimed to measure the hardness ratio of the sample in cases where the difference between ground and unground RHA reinforced composites is small and large. Samples reinforced at 0%, 1%, 2%, and 4% were prepared. The raw samples were sintered at 575° and argon atmosphere for 1 hour. SEM analysis for microstructure investigations and hardness analysis for hardness strengths were performed. It is observed that the highest hardness rate in the ground sample is containing 1% Rha.

Keywords: Composite, Rha, Powder Metallurgy, Matrix Metarials, Production

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Investigation of the Effect of Vibration in the Production of SiC Reinforced AA 6061 Matrix Composite Materials by Vacuum Infiltration Method

Murat ARI
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Abstract

Ceramic reinforced Al matrix composites are known to increase the mechanical values of Al alloys. The need for light and durable materials, especially in the aerospace, military application areas, automotive and maritime industries, constitutes an important force for these researches. High temperature values and properties to dimensional elements are important factors in composite properties. The biggest reason for this demand for Al alloys is that they are lighter than steel and can show the same properties. Ceramic matrix Al matrix composites are produced by many methods such as mixed casting, powder metallurgy and infiltration. In the vacuum infiltration method we used in this study; the liquid matrix infiltrates into the porous reinforcement by applying a negative pressure. The method is simple and quite economical. In this study, pore, microstructure and hardness ratios of vibration intensity of 5%SiC reinforced Al-6061 matrix composites of composite samples were investigated in vacuum infiltration with vibration. In the vacuum infiltration process, liquid AA-6061 metal was infiltrated with vacuum at 500, 1000 and 1500 Hz vibrations without vibration into the tubes containing 5% SiC. According to the microstructure analysis, it was observed that the homogeneity of the reinforcement element distribution was the highest in the 500 Hz sample. The highest hardness value was obtained from the matrix of the sample infiltrated at 500 Hz vibration. Considering the porosity ratios, it decreased with increasing vibration rate. The lowest pore ratio was observed at 1500 Hz vibration.

Keywords: Aluminum, SiC, vacuum, vibration, metal matrix composite, aluminum matrix composite

Ballistic Evaluation of Armor Plates at Different Angles

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Abstract

Developments in weapon systems have created the need for enhanced protection day by day. Researchers need to understand the behavior and deformation mechanisms of mechanical protective materials. Armor, which is an important part of the defense industry, has undergone many changes and developments from the past to the present. The ballistic performance of the armor can be improved by choosing the right material and improving these material properties or by working on the armor plates. In this study, the aim is to compare the directional deformation values on the plate in the explicit dynamic analysis of Armor 500T and Ramor 500 hybrid material plate using 3 different three angles (0°, 30°, 60°). 7.62 x 51 NATO bullet design lead material was used for the tests. It was determined that the directional deformation decreased 3.58 times with the increasing angle of the plates. With this study, remarkable findings have been obtained for the improvement of ballistic performance that can be used in the defense industry.

Keywords: Bullet, Armour Plate, Finite Element Method, Explicit Dynamics, Ballistic

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The effect of The Use of Different Materials and Design Optimization in The Connecting Rod on Fatigue Analysis

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Abstract

Connecting rods are one of the most used parts in internal combustion engines today, and they have the ability to convert linear motion to rotational motion and vice versa. Different forces acting on the connecting rod cause serious deformation, fatigue, and damage on the connecting rod. The automotive industry is also working on connecting rods with good durability, longer service life, and lighter weight. In this study, static and fatigue analyzes were carried out using the finite element method by applying C45 steel, AISI 4340 steel, and Titanium material to the connecting rod design. Connecting rod designs were designed with the CATIA program and analyzed by the Ansys program. The total deformation, equivalent elastic strain, equivalent stress, factor of safety, life, damage, and fatigue sensitivity parameters of the materials were inquired by analysis. When C45 steel is used instead of the titanium material used in the existing connecting rods, it has been observed that the deformation, stress, and life values close to the titanium material are obtained. With the results of the analysis, 2.07 times less deformation, 0.3% higher stress, and 10 times more cycle number are obtained with C45 steel material in comparison to titanium.

Keywords: Connecting Rod, Material, Finite Element Method, Static Analysis, Fatigue Analysis

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Estimation of Electric Vehicle Growth in Turkey

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Abstract

In the historical process, there have been energy transformations in the world. Today, we are in a such transition, especially the climate change and its potential effects are the biggest triggers of this transition. Climate change is shown among the causes of more frequent and large-scale natural disasters all over the world. While climate change is caused by global warming and global warming is caused by carbon emissions, fossil fuels are the greatest responsible for carbon emissions. Many countries have taken action against this situation and have given incentives and policy commitments. Among these, electric vehicles have an important place. The use of electric vehicles, especially in increasingly crowded cities, will also have a positive effect on air quality. For all these reasons, it seems that electric vehicles will take more place in our lives and helps to fulfill the CO2 emissions pledges of countries. On the other hand, electric vehicles require extra electric utility, and charge stations. Furthermore, consumer behaviors will also change. So it is crucial to estimate the growth of electric vehicles in order to forecast the possible effects of electric vehicles. To do this, forecasting the number of electric vehicles can be considered as a first step. So, this paper aims to estimate electric vehicle numbers in Turkey, by 2050. A curve-fitting method was utilized based on the change in population to predict the yearly increase in the number of electric vehicles. An S-shape curve was preferred, which better models the spread of new products in the market within the curves.

Keywords: Electric vehicles, Curve-fitting, S-shape curve, Modelling, Estimation

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Investigation of the Effect of Some Metals on Galium aparine L. Plant Peroxidase and Catalase Enzyme Activities

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Abstract

Free radicals can damage important structures such as proteins, DNA, and lipids in living cells due to their unpaired electrons [1]. Living systems develop defense mechanisms to prevent the formation and damage of free radicals with enzymatic and non-enzymatic antioxidant defense systems. Peroxidase and catalase are enzymes with antioxidant properties [2]. Peroxidase (POD, E.C: 1.11.1.7.) is an oxidoreductase enzyme that catalyzes the oxidation of many organic and inorganic substrates in the presence of hydrogen peroxide. Catalase (CAT, E.C.1.11.1.6) is an antioxidant enzyme that catalyzes the conversion of hydrogen peroxide to O_2 and H_2O molecules [4].They are involved in defense mechanisms by helping the lignification process of damaged tissues in plants [5]. These enzymes in plants can be affected by external factors and metals found as waste in the environment by increasing or decreasing their activities. In this study, the effects of some metals on the activity of partially purified POD and CAT enzymes from the Yogurt plant (*Galium aparine* L.) were investigated. For this purpose, *Galium aparine* L. plant was obtained fresh from Sakarya, Turkey. *Galium aparine* was homogenized and partially purified in phosphate buffer 0.1 M pH: 7.0 at 4°C. POD activity was determined at pH 7.0 using 3 mM 4-methylcatechol and 1 mM H_2O_2 substrates, and CAT activity was determined at pH 7.0 using 20 mM H_2O_2 substrate. Then Fe(III), Cu(II), Mn(II), Co(II), Ni(II), Ba(II), Ca(II), Pb(II), Hg(II), Cd(II)) metals at 0.5mM, 1mM and 5mM concentrations were interacted to examine their effects on POD and CAT enzyme activities, and the activity changes of enzymes were investigated. According to the results, it was observed that POD enzyme activity inhibited 84.68% in 1mM Hg(II) and 55% in CAT enzyme activity in 5mM Pb(II). All tested metals with 0.5 mM concentration showed no significant inhibition of either enzyme activity.

Keywords: *Galium aparine* L., Peroxidase, Catalase, Metals, Activity

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Convergence by Modified Post-Widder Operators Preserving e^{2ax}; a > 0

Gülten TORUN [1]

Abstract

Linear positive operators take an important place in approximation theory. The purpose of approximation theory is to obtain an approximation by representing an arbitrary function in terms of other more useful functions.

In 1941, Widder examined the Post-Widder operators for $f \in C(0, \infty)$ and these linear positive operators protect only fixed functions. He was investigated deeply the convergence of Post-Widder operators in [1].

In recent years, the approximation properties of the modified Post-Widder operators preserving the functions constantly and exponential were studied by Gupta & Maheshwari [2] and Sofyalıoğlu & Kanat [3].

In this article, Stancu type Post-Widder operators are introduced, which are a modification of the Post-Widder operators that preserve the functions constant and exponential. The uniform convergence of these modified linear positive operators for the function f on $[0, \infty)$ is examined and then the convergence rate is investigated with the help of the continuity module. The Voronovskaja type asymptotic formula is obtained to examine the asymptotic behavior of these operators. Finally, numerical examples and graphs are given to show the convergence of Stancu type Post-Widder operators and compared with Post-Widder operators.

Keywords: Post-Widder operators, Stancu type Post-Widder operators, Korovkin type theorem, Modulus of continuity, Voronovskaja type asymptotic formula.

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References

[1] Widder, D.V. (1941). The Laplace Transform. Princeton Mathematical Series, Princeton University Press, Princeton, New Jersey.

[2] Gupta, V., & Maheshwari, P. (2019). Approximation with certain Post-Widder operators. Publications de L'Institut Mathématique Nouvelle série, tome. 105(119), 131--136. doi: 10.2298/PIM1919131G

[3] Sofyalıoğlu, M., & Kanat, K. (2020). Approximation properties of the Post-Widder operators preserving $e^{2ax}, a>0$. Math Meth Appl Sci, 43:4272-4285. doi: 10.1002/mma.6192

The Importance of Zooplankton Fatty Acids in Marine Ecosystems

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Abstract

Zooplankton act as a transition between organisms in the lowest trophic levels and organisms in the highest trophic levels in aquatic food webs. In this way, it plays a key role in the transfer of energy from the lower to the upper trophic levels. One of the most important molecules involved in energy transport along the plant (phytoplankton) - animal (fish) interface in food webs is lipids, which are transported as energy source, and fatty acids (FAs) from lipids. In particular, plant organisms such as phytoplankton in aquatic ecosystems constitute the most important source of essential fatty acids (EFAs), the main source of which is plant organisms in all ecosystems. Zooplankton provide to transport the essential nutrients by feeding. These nutrients reach humans by organisms such as fish at higher trophic levels that feed on zooplankton. In addition, fatty acids, which have important physiological functions such as reproduction, growth and health, not only provide information about diet as trophic markers, but are also used as good bioindicators. Especially in recent years, they are used as early warning signals to detect the presence of natural and chemical stress factors in the detection of adverse conditions such as pollution in aquatic ecosystems. In this study, the importance of FAs of zooplankton, which are primary consumers, in aquatic ecosystems, especially marine ecosystems, has been tried to be emphasized. In this study, trophic features such as 20:5ω3 (EPA), 20:6ω3 (DHA), 20:4ω6, 18:3ω3 and trophic features such as 18:1ω9, 16:1ω7, EPA/DHA ratio were determined. It has been tried to compile the transport of trophic marker fatty acids, which are important in terms of food chain, via zooplankton, and the responses of fatty acids as bioindicators when the environment is exposed to any pollutant. As a result, FAs of zooplankton are indispensable biochemical molecules in marine ecosystems and related aquatic ecosystems as trophic markers, nutrient transport and bioindicators in determining ecosystem functioning and ecological sustainability.

Keywords: Zooplankton, Fatty acids,Trophic marker, Biological indicator

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Spectral Decompositions of the Generalized Difference Operator Δ^m over the Sequence Space c

Nuh DURNA[1]

Abstract

Spectra of bounded operators on Banach spaces have many applications. For this reason, the spectra of bounded linear operators have been studied by many people in recent years. This study aims to bring together some studies on the spectra of difference operators in the literature over the c sequence space and to provide a basis for related problems. So far, the problem has been solved up to a maximum of 2 orders on the sequence space c. However, Baliarsingh et al. in 2021 (Baliarsingh et al. 2021) calculated the fine spectra of the difference operator Δ^m, $m \in \mathbb{N}$ on c. There is a large literature on spectral decompositions of linear operators represented by certain limitation matrices on various sequence spaces. In the present study, subdivisions of the spectrum, which are approximate point spectrum, defect spectrum and compression spectrum, are given for the difference matrix Δ^m, $m \in \mathbb{N}$ over c sequence space. Thus, the results obtained for, the difference operator Δ studied in (Başar et al. 2012). and the generalized difference operator $B(1,-1)$ in (Başar et al. 2011) in the case of $m = 1$, and the generalized difference operator $B(1,-2,1)$ studied in (Başar et al. 2011 in the case of $m = 2$, will be included and generalized in this study.

Keywords: approximate point spectrum, defect spectrum, compression spectrum, generalized difference operator, band matrix

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Assessing the Social Infrastructure Areas as Urban Amenities in Terms of Urban Quality of Life: A Case Study in the City of Kayseri

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Ozan HOVARDAOĞLU[2]

Abstract

Quality of life is a priority concept that is questioned today and is the subject of studies by many disciplines on a national and international scale. In the literature, quality of life is primarily associated with human rights. The first article of the Universal Declaration of Human Rights mentions that all humanity is born free and equal in terms of rights, and the twenty-fifth article mentions the necessity of having an adequate standard of living for everyone to lead a good life.

These rights are; It is associated with various needs such as housing, nutrition, and entertainment. In this context, high quality of life becomes possible with a living standard and living space that can meet the needs of individuals.

Evaluation of the concept of quality of life on an urban scale reveals the concept of urban quality of life. Cities are the living spaces of individuals. In this framework, the discipline of urban planning becomes important in terms of increasing the quality of cities.

The concept of quality of life in Turkey is defined within the framework of legislation and standards specific to urban planning. Various definitions are made and standards are set together with the "Regulation on the Construction of Spatial Plans" and the "Regulation on the Principles of Plan Making". (Gündüz, 2020; Qawasmeh, 2014). One of these definitions is for social infrastructure areas.

This thesis aims to evaluate the impact of social infrastructure areas on the quality of life within the scope of evaluating them as an urban opportunities. The sample area determined for this purpose in the city of Kayseri. Accordingly, a semi-structured interview technique was used within the scope of the study, and the findings were evaluated within this framework

Keywords: Quality of Life, Quality of Urban Life, Social Infrastructure Areas

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Remote Control of Variable Angle Displays in Industrial Facilities with Mobile AR

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Abstract

Installation systems used in production are usually placed under the roof of the plant. Production system and devices working on the ground; Requirements such as electricity, compressed air, normal ventilation, oil, hot water and water vapor are provided through the output modules of the installation systems. There are indicators on these modules that show the pressure, temperature and similar parameters of the module. During the periodical maintenance periods, the indicators of modules are checked one by one by the maintainer. The difficulty with this process is that modules are high and inaccessible areas. Also, in order to interpret the checked indicator values and to determine whether the indicator works correctly or not, it may be necessary to evaluate it with other indicator connected to that system.

Indicators are monitored electronically with automation systems and can be interpreted with scada systems. Although installations are equipped with sensors and monitored with scada systems, it may be necessary to verify the sensors from time to time, and sometimes back up with non-digital displays due to the software side that can be disabled for a while. Indicators are monitored by maintainers. For reasons, it is necessary to read and interpret data in a way that will not hinder production and risk the safety of property and life in order to obtain and verify data from hard-to-reach indicators.

In this direction, a mobile application has been designed that can work on a mobile phone that everyone has, and reads and identifies data remotely using augmented reality (AR) techniques. This application can receive and compare digital data from the SCADA system via the facility's network. If there is no network, it can work by comparing the technical values previously loaded to the software and interpreting it with other sensors read when necessary.

Keywords: Augmented reality, Busbar, Busway, Installation indicators, Mobile application

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Street Lighting Solutions Compatible with Wireless Communication

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Abstract

Control and dimming features in street luminaires are seen as prerequisites for energy saving. Luminaires operating in a single scenario consume energy even when lighting is not required. For this reason, it is considered appropriate for the luminaires to operate at full capacity at certain times when light is needed, and at a lower capacity during daytime or bright hours. The automation infrastructure that will enable to work in this way makes it difficult to intervene in case of malfunction and may also cause weakening in the control signal. In order to eliminate negativity, it is a very important need to design luminaires suitable for wireless communication.

In this study, the design of mechanical elements and solid modeling were created. Appropriate materials have been selected to be compatible with technology. Physical layout schemes have been created for the components to be used. Situation scenarios were produced by designing mounting apparatus, optical parts, light angles, electrical-electronic equipment and cooler. Studies with thermal analysis have been confirmed. After the components were determined, the circuit diagrams were created. Finally, the necessary tests were completed. As a result of the comparison of virtual tests and physical tests, electronic and software errors were checked.

When dimming is desired in led street lighting, dimming cables must be added in addition to the outside of the luminaire. In this way can it be adapted to automation systems. In the product developed as a result of study, wireless communication is provided by placing an integrated socket on the luminaire without removing the dimming cable of the luminaire, and a communication module integrated into socket. In addition, the ability to add DALI or 1-10V feature to the product depending on the dimming protocol constitutes the innovative and original aspect of the work.

This study, it is aimed to eliminate the disadvantages of wired applications. When the researches are examined, it has been determined that wireless street lighting systems that provide high energy efficiency also reduce the carbon footprint.

Keywords: Wireless communication, Street lighting solutions, Efficiency, Carbon footprint

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Developing a Battery Management System Appropriate for the Electricity Network Scale

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Abstract

Global warming, environmental pollution, CO-NOX problems from fossil fuels and energy scarcity have led governments and industry to seek an alternative solution. Restrictions and bans on the use of fossil fuels have been introduced by many governments to prevent this pollution. This policy aims to provide consumers with an alternative means of transportation and to direct their attention to clean and environmentally friendly resources. Therefore, it shows that renewable energy sources have become a great opportunity to removing carbon and reduce dependence on fossil fuels.

The prevalence and share of renewable energy sources in the electrical power system has been increasing. Therefore, concerns have arisen about the reliable and satisfactory operation of the electric power system. With penetration of renewable energy, new challenges have emerged in the energy sector such as suppressing power surges and spinning reserve support capacity. Battery energy storage systems play an important role in renewable energy integration and storage.

In this context, while performing all the functions of battery management systems in the retail energy sector; It is aimed to locally produce and develop a new generation, modular and smart battery management system that will offer unique additional innovative solutions to these hardware. The basic functions that should be in the conventional battery management system are; data acquisition, safety protection, battery status determination, charge control, cell balancing and thermal management system. With the technological developments, functions such as data collection, modeling and condition prediction, fault diagnosis, health management, cell balancing, communication, IOT and cloud technologies have been defined. In parallel with technological development, it is seen that the necessary functions have been integrated into the BMS over time. It is aimed to add the developed SoH algorithm and active balance features to the BMS. It has been foreseen that the BMS, which result of the study, will be an innovative, advanced system for energy storage systems suitable for the scale of the electricity grid, and will come to the fore with its originality among its counterparts.

Keywords: BMS (Battery Management System), Electricity generation and management, Energy systems, Solar energy

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Real-Time Programmable Timer to Allow Autonomous Operation of a Solar Energy Irrigation System, Taking into Account Driver Fault Signals

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Abstract

Nowadays, solar energy is getting more and more widespread everywhere because it is not only nature- and environment-friendly but also economical in the long term. Water boreholes are a good alternative to irrigate agricultural lands where are far from away the living area and water sources. Wind or solar energy is widely used to draw water from the boreholes. In the solar irrigation systems, pump motor driver (inverter) may have not a build-in timer on it. In this case, it is required that pump motor must be started and stopped manually for a desired time interval. It is clear that this situation poses a challenge to those who use the system. In this study, a real-time programmable timer based on Arduino for a solar irrigation system which is situated far away from the centre of the living area and which doesn't have an external control system and build-in timer has been designed and tested. This programmable timer is used for making the solar irrigation system work in the desired time interval autonomously. In this study, pump motor driver in the solar irrigation system on which is being worked is Siemens Sinamics V20. This driver has no build-in timer on it. In order to run the pump motor in the desired time interval, one of a set of connection macros was chosen. For the macro in question, some of digital inputs to the inverter needs to be put in the logic state "1" and logic state "0" in a certain order. In situations like cloudiness, the output voltage of the solar panel system reduces, in which case the inverter gives under voltage fault warning message (F3). For the designed timer, this situation has been taken into account.

Keywords: Arduino, Solar irrigation, Solar energy, Programmable timer, Autonomous operation

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Real-Time Programmable Timer Designed for a Deep Water Pump System Powered by a Solar Power System and Not Utilizing an External Control System

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Abstract

In this study, it is presented a real time programmable timer which is designed for a deep water pump supplied by only solar energy (solar panel), which is situated on a place far away from a center of living area. In this solar system, Siemens sinamics V20 inverter is used for driving water pump. To be able to run the system in desired time interval is possible only manually without any external control system like PLC, because it has no built-in timer on it. This driver has a set of unique control schemes called "connection macros". In this study, A real time programmable timer for "connection macros 7" (Cn007) based on arduino is designed to run the water pump automatically in desired time interval. The timer, which has been tested, is shown to work properly. In this working mode, it is assumed that the inverter gives no fault. Necessary pulses for stop and start the pump motor is applied to the related digital inputs to the inverter by means of a relay system. One important advantage of this system is that solar battery, solar charge conroller and external inverter, which have in common equipment in such systems are not used in this system.

Keywords: Solar energy, Irrigation Timer, Arduino , Solar irrigation systems

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Investigation of Energy Management Studies in Specified Microgrid Applications

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Abstract

Today's electricity grid is rapidly transitioning from the traditional concept to the smart grid concept with the developing control, automation and software technologies and is mainly equipped with distributed energy resources and energy storage systems. The most suitable smart grid concept that facilitates this situation is microgrid (MG). MGs connect generation and consumption points within a defined boundary and is supported by energy management units. Energy management systems are developed to optimize the power output of distributed power generation units for meeting the load demand economically, to regulate and automatically supply the frequency and voltage level of the MG systems, and to facilitate the transition between grid-tied and islanded operating modes. It plays an important role in the MG paradigm. In this chapter, a research study is conducted on energy management studies for specific MG applications. MGs have mainly been considered in two segments as on-grid and off-grid as first stage. Then, on-grid MGs are divided into community-level and residential-level categories. MGs in the the area of regional-rural, industrial-commercial, hospital, university campus and military are included in the community-level MG category while private residential customers that can be found in a particular residential area, as well as individual homes, buildings and structures like farms are included in the residential-level MG category. In off-grid MG applications, all remote MG varieties have been examined. This study will be a guide for researchers and practitioners who will carry out an MG study or installation in any of the categories described, in terms of energy management studies and also in terms of giving an idea for the relevant MG installation. In the relevant literature, these studies are handled one by one according to the campuses where MG is applied, while energy management studies for all campus types are discussed here as novelty.

Keywords: MG applications, energy management, renewable energy

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PI Contollers Design Employing Ziegler-Nichols Method and PSO for DC-DC Boost Converter

Erdoğan DİNÇ[1]

İbrahim ALIŞKAN[2]

Abstract

This paper presents PI controllers whose parameters are tuned with Ziegler-Nichols Method, and Particle Swarm Optimization (PSO) methods for a Continuous Conduction Mode (CCM) boost DC-DC converter. Recently, boost converters have been widely used to keep the DC grid voltage of electric vehicles at a constant amplitude. On the other hand, special techniques are required in the modeling of boost converters, which are nonlinear systems due to their discrete nature. In this study, firstly, the linear model of the converter, which is designed with an input voltage range of 5-15 V and an output voltage of 25 V, is obtained in accordance with CCM operation. Secondly, the system model for the nominal operating conditions is obtained with the state-space averaging model and small signal model approaches. After that, the controllers were designed with Ziegler Nichols Method and Particle Swarm Optimization. PSO was performed in two different ways with 10 and 20 particles. Then, the obtained proportional gain and integral gain were synthesized as an analog circuit with opamps. The control performances of these three PI controllers designed with two different methods are presented by using the results of simulation studies, which are carried out in PSIM. The Mean Squared Error (MSE) is considered as the control performance index for the presented studies. Finally, the results revealed that the PI controller developed by the PSO algorithm applied with 20 particles was superior to the others.

Keywords: Continuous Conduction Mode (CCM), State-Space Averaging Model, Boost Converter, PI Controller, Ziegler-Nichols Method, Particle Swarm Optimization

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Influence of Intermediate Support on the Vibration and Stability of a Heavy Column with Tip Mass

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Abstract

This study deals with the transverse free vibration of a uniform heavy column with an intermediate support. The column is assumed to be under its own weight, *i.e.* it is subjected to a linearly varying compressive axial load, and to carry a mass with rotational inertia at the free end. Compressive axial loads (as is well known) decrease the natural frequencies of vibration. The decreasing amount is usually more pronounced for the lowest (fundamental) frequency than for the other higher frequncies and, the fundamental frequency reaches zero when the compressive load equals the buckling load. Therefore, an intermediate additional support is required for the column to maintain or increase its fundamental natural frequency. In the study, the column is modelled as a Euler-Bernoulli column with different end conditions and two structural configurations are considered, namely, columns which are clamped-free end pinned-free, respectively. For analysis purpose, the column is separated into two segments and the frequency equation is obtained by formulating equations of motion with variable coefficients for each part of the column and solved by using the Frobenius (power series) method. Combained with end boundary conditions and the continuity and zero deflection conditions at the intermediate support, natural frequencies are calculated from the roots of a transcendental frequency equation in which the position of the intermediate support is unknown. The obtained numerical results including both supporting conditions are depicted in various plots. The effect of the compressive axial load, the location of the intermediate support and the end mass parameters on the fundamental frequencies and buckling loads is discussed.

Keywords: Natural frequency, Heavy column, Buckling load, End mass, Intermediate support

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Setting a Priority Order for Determining Earthquake Safety in Educational Buildings

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Abstract

Turkey is a country that has the world's largest earthquakes. Therefore, educational buildings in the country should be made safe against earthquakes. In a country with approximately 55,000 educational buildings, it does not seem possible to determine the earthquake resistance performance of all buildings without priority rank. Because, according to the decision to be made as a result of earthquake performance studies, thousands of buildings will need to be retrofitted or demolished. This situation will cause both disruption of education and very high investment costs.

In this study, the priority order of the educational buildings whose earthquake performance level will be determined by applying multi-criteria decision-making methods has been formed. Five main criteria were determined to be used in the methods, and criterion weights were determined by the Analytical Hierarchy Process Method. It was studied on 50 randomly selected educational building alternatives. Multi-criteria decision methods WASPAS, TOPSIS, and VIKOR methods were used to set the priority rankings. Rankings made with three different methods were compared with each other using the Spearman Rank Correlation Test. In this context, finally, the rankings obtained from the three methods were combined with the BORDA Counting Method, which is the data combination method, to obtain a single rank.

Keywords: MCDM Methods, Prioritization, BORDA Method, Earthquake, School Buildings

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Impacts of Remote Working on Productivity of Civil Engineers during the COVID-19 Pandemic

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Abstract

The COVID-19 pandemic, which has had a shocking effect all over the world, has deeply affected the functions of several industries. Many industries, including the construction industry, had to switch to different ways of doing business due to the mandatory isolation decisions. For this reason, the transition to remote working, also known as Work from Home (WFH), has begun. Although remote work can be applied in activities such as design and management in the construction industry, it is not possible for activities that are carried out on construction sites. The rapid and compulsory transition to remote working has led to the need for comparison of the productivity of employees in the construction industry during their normal working conditions before the pandemic and during the remote working conditions after the pandemic. In this context, this study aims to compare the productivity of people working in the construction industry, who produced similar projects in Ankara before and during the pandemic conditions under the responsibility by the same crew. Moreover, another aim of the study is to identify the factors affecting civil engineering productivity and to create improvement opportunities and new perspectives for the sector. Firstly, a questionnaire was designed to determine and categorize the factors affecting civil engineering productivity. The questionnaire was composed of questions measured on a 5-point Likert scale. Cronbach Alpha (α) value was used to determine the internal consistency and the reliability. The responses of the participants were statistically analyzed, and the validity of the hypotheses were determined. This study utilized Independent Samples T Test, One-Way Analysis of Variance (one-way ANOVA), Mann-Whitney U Test, and Kruskal-Wallis H Test for statistical analysis. It was concluded that gender, work environment, and working hours are the main factors influencing the engineering productivity.

Keywords: COVID-19 pandemic, construction industry, productivity, remote work.

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Vertical Equivalent Earthquake Load and Time History Earthquake Analysis on a Sample Building

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Abstract

Spectral acceleration values that will affect the structure during an earthquake are obtained from the design acceleration spectra in the regulations, and the earthquake loads that will affect the structure are determined by the dynamic and static methods in the regulations. Although dynamic methods are more realistic and more difficult to understand, they are applied on all existing buildings if a sufficient number of natural vibration modes and their contributions reach the limit values specified in the regulations. Static methods, on the other hand, are obtained by calculating the spectral acceleration value determined depending on the dynamic feature of the structure, depending on the mass of the structure, and distributing it as a static load, taking into account the first mode of the structure. Compared to dynamic methods, there are limitations of usage areas and building height classes. In the regulations, in order to make the design earthquake calculation simpler, they suggest static methods as the design spectrum and liken it to the dynamic method. The main purpose of this study is to compare the vertical earthquake analysis required according to the structural defects defined in TBDY 2018 according to the code design spectrum and linear time history analysis. According to TEC 2018, static and dynamic earthquake load analyzes were carried out on buildings with different overhang rates. It has been observed that the structural results according to the dynamic lateral load analysis are quite low compared to the assumptions in the static method. The regulation remains on the safe side in calculating the vertical earthquake force with the static earthquake load analysis.

Keywords: TEC 2018, equivalent earthquake load, TH vertical earthquake load analysis, vertical design spectrum.

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Determination of Theoretical Radiation Shielding Properties of Different Types of Concrete

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Abstract

Cement, mineral additives and concrete are among the most widely used building materials in the construction industry today. However, in concrete production, additional mineral binders are needed to improve the working properties of concrete. It is important to know the radiation shielding feature of the building material for the health of living things by making environmentally friendly productions. Since concrete has such an important place in the construction industry, that is necessary to research concrete depending's a radiation shielding properties of on different concrete types. 46 types of mixture samples were analyzed, including samples produced with different types of admixtures and mineral-added concretes, samples produced without additives and with different aggregate types. In order to analyze the radiation shielding properties of concrete samples, mass absorption coefficients (μ cm^{-1}) at an energy level were analyzed according to the mass absorption coefficients of 59.543 KeV in the XCOM program. For the accuracy of the theoretically obtained data, it has been compared with the previous experimental data. When the theoretical analysis results are compared with the experimental results, it has been proven by the data that there is an average of 96% agreement between the two methods.

Keywords: Cement, Radiation, Mass Absorption, XCOM

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Nonlinear Deformation Capacities of RC Frames Under Seismic Loads and Pushover Analysis.

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Abstract

Reinforced concrete structures constitute an essential part of the building stock in Turkey. It is crucial to determine these structures' earthquake behavior realistically since they are located in a region where severe earthquakes occur. In this context, there are many studies in the literature. In addition to these, within the scope of this study, an RC framework system whose experimental data are available in the literature was selected and modeled with the help of Sap 2000 and Seismostruct, and the compatibility of experimental data with analytical data was compared. Then, time history analyses were carried out to determine the behavior of the RC frame system under the selected near and far fault earthquake records. It is known that confinement reinforcements are of great importance in determining the nonlinear behavior capacities of RC structures. To observe the effects of the confinement reinforcement on the selected frame system, nonlinear pushover analyses were carried out under different reinforcement details, and the ductility demands of the frame system were determined. According to the nonlinear and linear time history analysis, for the near field record, the lateral displacements are close to each other; however, for the far field records, the linear time history analysis gives bigger top displacements than the nonlinear time history analysis.

Keywords: RC Structure, Nonlinear analysis, Time history analysis, Ductility.

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Comparison of Reaction Wood of Some Tree Speciesses in Therms of Anatomical, Chemical, Optical and Fiber Morphologies

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Abstract

Environmental factors cause some wood defects in industrial trees. Reaction wood(RW) is one of the most important of these. It causes some physical, chemical, mechanical, anatomical and optical differences in deciduous and coniferous tree woods.

Samples were taken from the RW stems of some tree species naturally growing in Kastamonu. Some of the anatomical, chemical, fiber morphology and optical properties of the RW samples were analyzed and compared with opposite wood zones(OW) of each wood species in accordance with the standards. Also, the color changes were analyzed before and after drying. While the holocellulose content of Uludag Fir and Larch compression wood(CW) were found lesser(~3-4 %) and lignin contents higher than the OW(~34% for Larch and 12% for Uludag Fir). On the contrary the amount of holocellulose was found higher(~1-4 %) and the lignin was lower (at about 6-15%) in the tension woods(TW). It was observed that average fiber lengths are longer in TW(~50-54%) and shorter in CW(~13-17%) then the OW. In coniferous trees, the color difference in wet and oven-dry state is greatest in CW (~15-17 %); It has been determined that it is found in deciduous speciesses woods(~0,7-3 %).

Some differences were observed in the anatomical structures, optical, fiber and chemical properties of the RW and CW of the studied species. Due to the high lignin content of CW, some physical values such as water absorption and swelling will be low, so they can be used for small household and hand tools, ornaments, toys, etc. It is thought that it will be appropriate to use in milling and turning works. It is recommended that because of the lower lignin content and higher polysaccharide ratio, TW should be primarily used for cellulose, pulp and paper industry, where high mechanical resistance values are required.

Keywords: Reaction wood, anatomical and chemical structure, optical properties, compression wood, tensile wood

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Improving the Strength Properties of Different Types of Ready to Assemble (Rta) Household Chairs

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Abstract

In this study, the engineering design approach and product engineering methodology were utilized for improving the strength properties of various types of household RTA chairs produced in a manufacturer company that produces chairs in the Turkish Furniture Industry.

10 chairs were subjected to performance tests by using cyclic stepped increased loading method in terms of ALA (American Library Association Technology Reports). Totally, 150 tests were performed (10 chair model, 3 loading direction, 5 replication for each = 150), than strength of chairs evaluated with allowable design loads (light service, medium service and heavy service) in terms of ALA. According to the maximum load values obtained from the test results, computer-aided three-dimensional structural analyzes (Finite Element Method) of the chairs were made and their weak points were determined. Considering the weak points determined for each chair model, strength-enhancing optimization alternatives were realized. According to the rational alternatives determined among the optimizations, the prototypes of each developed chair model were subjected to the performance tests in ALA, again, 150 improved model chairs, without changing the appearance of the original models.

As a result of the study, the RTA chairs, which were produced by the manufacturer and were found to have insufficient strength, were improved with product engineering methods, including performance tests, and they were provided to meet the required performance values for domestic usage.

Keywords: Product Engineering, Performance Testing, Chair, Structural Analysis, Finite Element Method.

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Mechanical Performance of Chairs Without Fastener Constructed of Wood Based Panels With Computer Numerical Control (Cnc) Machines

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Abstract

Furniture engineering design and strength analyzes are relatively new concepts and not systematically applied in many countries, including Turkey. For the production of strong, durable and quality furniture frames; it is possible to assemble the furniture members to each other with fasteners as well as joints without fasteners. Since the strength, durability and cost problems of fasteners are still experienced, it is necessary to investigate the strength of furniture frames such as chairs without fasteners.

In this study, the mechanical performance of chairs constructed of wood based panels without fastener were investigated. The aim of this study was to evaluate the strength of different types of chairs without fastener which produced with CNC machines by using engineering design approach and product engineering methods including performance tests. In the production of chairs, 18 mm thick oriented strand board (OSB), medium density fiberboard (MDF) and Oriental beech (Fagus orientalis L.) plywood (KKP) were utilized as wood based panels. Within the scope of the study, 4 different chair types without fasteners were designed and produced and performance tests were carried out in 3 different loading directions (front to back, back to front and side-thrust) with cyclic stepped increasing loading method according to the principles of American Library Association (ALA) specification. Totally, 108 chairs without fastener were prepared and tested.

As a result of the study, it was concluded that the chairs produced from KKP gave the best performances, while the chairs produced from MDF gave performance values close to KKP, except for the side-thrust test data. The mechanical performance values of the chairs constructed of OSB were very low. In conclusion, it could be said that the chairs constructed of KKP and MDF without fastener have been found to have sufficient mechanical performance.

Keywords: Engineering Design, Cyclic Stepped Increasing Loading Method, Chair Performance Tests, computer numerical control (CNC).

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Densification Effect on Wood Materials

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Abstract

In this study, the densification effect on wood material was investigated. In doing so, hornbeam (*Carpinus betulus* L.) wood and Cottonwood (*Populus canadensia*) were used. 10%, 20% and 30% densification levels were chosen to densify cottonwood. 3-point bending and parallel-to-grain compression tests were conducted for non-densified hornbeam and cottonwood, and densified cottonwood according to ASTM D 143 standard. The average densities of the hornbeam wood and cottonwood were 0,66 gr/cm³ and 0,46 gr/cm³ before densification. After the densification process, average densities of the cottonwood were 0,51 gr/cm³, 0,55 gr/cm³ and 0,60 gr/cm³ for 10%, 20% and 30% densification levels, respectively. In the compression test, hornbeam wood has the highest average strength (52,45 MPa). Cottonwood with a 30% densification level had 43,17 MPa compression strength with a standard deviation of 0,62 MPa. The lowest average compression strength was obtained for non-densified cottonwood. In 3-point bending tests, bending strength and modulus of elasticity of wood were determined. According to test results, the average bending strength and modulus of elasticity of hornbeam wood were 100,86 MPa and 11211,20 MPa, respectively. Cottonwood with a 20% densification level had the highest average bending strength and modulus of elasticity among the cottonwood sample group. The densification process had a significant effect on the strength of the cottonwood. The study showed that densification would be used to increase the strength of the wood materials and non-utilized wood species for the forest products industry could be value-added materials.

Keywords: Densification, cottonwood, hornbeam, bending strength, compression strength and modulus of elasticity.

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Current Situation of Wood Pellet in the World and Turkey

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Abstract

With the rapid growth of the global population, a linear increase in energy demand has been observed. Depending on the increase in energy demand, countries continue to work on the development of renewable energy in order not to make the economy too dependent on energy imports. Many countries in the world are struggling with difficulties in the energy sector due to the lack of reliable energy sources and environmental problems triggered by polluting energy sources such as fossil fuels. Today, European countries have aimed to produce and use energy from biomass as part of the solution to mitigate climate change. Biomass is defined as any natural/organic material mass obtained from existing plants and animals, whose biological origin is non fossil and renewable. It is a sustainable alternative energy source that is used for heat generation, electrical power and transportation and has the potential to significantly surpass fossil fuels. Many scientists believe that a significant portion of the energy can be obtained from wood pellets, which have a higher energy content than petroleum, are cheaper than fossil fuels, and are sustainable.

In this study, the current situation of wood pellet production in the world and Turkey has been stated by examining the current literature, its heating values and emissions have been evaluated, and conclusions and recommendations have been made.

Keywords: Raw materials, Wood pellet production, Carbon emission,

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A Research on Improvement of Production Processes in the Lean Manufacturing System: Case Study for Mold and Machine Design for Bunk Ladder

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Abstract

Lean production, which is a management philosophy derived from the Toyota Production System, is a production system that does not contain any unnecessary elements, and in which elements such as error, cost, stock, and labor are minimized. In this system, there are the concepts of "Muda", "Muri" and "Mura", which point to the types of waste caused by all kinds of wasted resources.

Lean production system has been utilized in the Çilek Furniture production line, and the processes of all parts in production are constantly examined and improvement works have been carried out. During these improvement works, the production processes of the bunk ladder made of medium density fiberboard (MDF) were examined in detail, and as a result, unnecessary transportation and waiting, unnecessary processing and defective production Mudas in this process and their reasons were determined.

In this research, specifically, an innovative machine has been developed and adapted to the production system in order to perform the hole and notch operations for the bunk ladder step piece in the same mechanism. Thanks to this machine, which was developed and started to be used, waiting times in front of the machine have been completely eliminated, in-production piece transports have been reduced, and part labor costs have been reduced by decreasing the processing times. Within the scope of the research, it has also been developed a reciprocating welding mold that allows the compression process to be performed automatically after the pieces are placed in the mold, instead of the manual mold used in the welding process of ladder metal parts. Thanks to this welding mold, which completely eliminates the quality defects and the risk of occupational accidents, the performance of the production process has been increased by yielding the cost and labor.

Keywords: Lean production, Muda, furniture, furniture production, production line, machine design, mold design.

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Assembly Line Balancing using Lean Techniques and Mathematical Modeling: A Case Study

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Abstract

Planning is an important stage for just-in-time production for companies. The aim is to organize the production flow and make the orders ready for delivery as soon as possible. The inability to meet incoming demands on time may result in customer losses and weakness against the competitiveness of other companies. In order to avoid these two problems, it is crucial to use the resources efficiently and effectively which is possible as a result of the balanced distribution of workloads to workstations on assembly lines. Businesses often use traditional methods. Employees/foremen/engineers decide on line balancing for products using their previous experience. Due to experience-based line balancing, workload imbalances arise between stations. It is necessary to use better or even optimal line balances to avoid customer and also employee dissatisfaction. In this study, our aim is to assign the tasks to stations taking into account the priority relations between the tasks and minimizing the cycle time for the given number of stations. We conduct a case study for our studies in a company producing owens. Firstly, we eliminate non-value added activities via lean manufacturing techniques. Then, we balance the assembly line using mathematical modeling and make the required analysis. According to the computational experiments, we maximize the productivity of the assembly line.

Keywords: Assembly line balancing, Lean manufacturing, Optimization, Productivity, Mathematical Modeling

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Application of Intuitive Fuzzy Sets in Diagnosis of Chest Diseases

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Abstract

In fuzzy systems, some criteria must be met for a feature for belonging to a particular cluster. The degree to which the feature is a member of the defined set needs to be calculated. Intuitionistic Fuzzy Sets outperform the classical fuzzy logic approach in eliminating uncertainties about the degree of belonging of a feature to the set. In Intuitionistic Fuzzy Sets, a number of methods are used, such as distance measurement, to determine the degree of hesitation regarding the membership, non-membership, and membership of a set. Distance measurements show the degree of difference between transmitted information. In this study, intuitive conditions were defined according to the symptoms and complaints of the patients in the diagnosis of some chest diseases such as Lung Cancer, COPD (Chronic Obstructive Pulmonary Disease) and Acute Bronchitis. It was analyzed by Intuitionistic Fuzzy Set Method using the Minkowski distance measurement and the Manhattan distance measurement summation methods. According to the results, it was determined which disease cluster the patients belonged to. The Intuitive Fuzzy Sets Method, which eliminates information uncertainty, facilitates the diagnosis of diseases. With a pattern scanning application in the literature, the reliability of the results of the diagnosis of patients using Intuitionistic Fuzzy Sets Method was examined. The results obtained support the studies on similar subjects. In future studies, it can be used in the diagnosis of diseases in the health sector by taking into account the different distance measurements in which the complaints of the patients and the test results are evaluated together. In other sectors, it is recommended to apply the Intuitionistic Fuzzy Set Method in grouping processes and verify the results obtained.

Keywords: Intuitionistic Fuzzy Sets, Disease Diagnosis, Minkowski Distance Measurement, Manhattan Distance Measurement..

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Solving Fully Intuitionistic Linear Programming Problems in Intuitionistic Fuzzy Environments using Ranking Function

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Abstract

This paper focuses on two different methods to solve the fully intuitionistic fuzzy linear programming (LP) maximization or minimization problem and find the fuzzy optimal solution to the problem. The proposed methods are an extended version of the fully fuzzy linear programming problem for intuitionistic LP problems with constraints and variables. All of the problem's coefficients and variables are asymmetrical intuitionistic triangular or trapezoidal fuzzy numbers. Some basic definitions and arithmetic operations such as addition, subtraction, multiplication, and scalar multiplication between two intuitionistic triangular or trapezoidal fuzzy numbers are given. The coefficients and variables of the problem, which have asymmetrical intuitionistic triangular or trapezoidal fuzzy numbers, are transformed into a crisp using these operations and several properties of ranking functions. However, two different methods are used when applying these processes and are explained in detail. Thus, the fully intuitionistic linear programming problem is transformed into a single-objective linear programming problem with exact coefficients and variables that is easier to solve. Moreover, in order to explain the methods, an example from the literature that was solved with a different method is given and obtained a Pareto optimal solution. Finally, a comparison is made of the solutions attained by these methods.

Keywords: Intuitionistic triangular fuzzy number, fuzzy programming, ranking function, linear programming, arithmetic operations.

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A Review of Scheduling Problems with Uncertain Processing or Setup Times

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Abstract

Scheduling plays a central role in manufacturing environments for the delivery of reliable products on time. The review of the scheduling literature shows that the studied scheduling problems are mainly for the deterministic case where all parameters of jobs are fixed and known in advance. Nevertheless, the assumption that the parameters of jobs are fixed is not valid since job parameters are uncertain for some real-world environments. This paper reviewes the scheduling literature utilizing the uncertain processing times or setup times. The reviewed problems are classified based on shop environments (single machine, parallel machine, flowshop, job shop), performance measures, uncertain processing times, or uncertain setup times.

Regarding to shop environment, about 50% of the papers considered flowshop environment following by 22% for single machine environment. The other shop environments received much less attention from the researchers. Given that other shop environments are common in practice and uncertainty in processing or setup times apply for some of these shop environments, more work is needed on these problems.

When the approach taken to address these problems is considered, developing dominance relations received the highest attention among the researchers investigating uncertain processing or setup times. It should be noted that dominance relations help reduce the search space but it is hard to find the optimal solution with the dominance relations. Therefore, the dominance relations should be used along with implicit enumeration techniques such as dynamic programming and Branch-and-Bound algorithm.

Regarding to performance measures, more emphasis is given to completion time based performance measures such as makespan and total completion time while much less emphasis is given to those problems with due date related performance measures such as number of tardy jobs. Hence, more research is needed for due date related performance measures.

Keywords: Scheduling, review, uncertain processing times, uncertain setup times

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Project Management System Implementation in the Aircraft Maintenance Factory

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Abstract

In this study, a sample aircraft was determined and a study was carried out in the light of historical data. The average capacities of the workshops were determined and the waiting workshops were analyzed by simulation. When the number of personnel was balanced, the data were analyzed and the average lead time was determined. In addition, with the project management system created in the Microsoft Access database, order entry and query were provided, and the stock of warehouses could be queried at the stage of taking the order by determining the material list required for the renewal processes according to the aircraft type. Since these processes are carried out at the stage of order taking, waiting times for the workshop can be reduced and the average delivery time for the customer can be given since the average completion time of the aircraft can be determined.

Keywords: Aircraft maintenance, project management

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The Identification of Bacterial Species in Marine Mucilage by DNA Fingerprinting

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Abstract

Marine mucilage has become the agenda of many countries in recent years, as it has caused pollution in the seas and coastal waters of Turkey. Although mucilage is more common in stagnant sea waters, it is caused by climate changes, overfishing, environmental pollution from domestic and industrial wastes and sewage waters, and an increase in toxic secretions produced by excessively proliferating phytoplankton and microorganisms. Pathogenic microorganisms in the mucilage layer form a biofilm layer, preventing the sun's rays from reaching the lower layers of the sea and causing the extinction of marine species involved in the purification of sea waters. The formation of a biofilm layer causes difficulties in the destruction of mucilage. Since mucilage is known to reduce the quality of seawater and put marine species at risk, it can cause food and water shortages and threaten human health. Therefore, first of all, the aim is to determine the species of pathogenic microorganisms and to apply species-specific disposal methods to destroy the mucilage layer. When culture methods are used to isolate pathogenic microorganisms, microorganisms may pass into the viable but not culturable (VBNC) phase due to conditions such as sea water temperature, pH, and salinity and cause false results. On the other hand, since there is more than one microbial diversity in the mucilage layer, it may cause difficulties in isolation, waste of time or contamination in the culture method. Therefore, it is recommended to use microbial fingerprinting method (T-RFLP) targeting 16S and 18S rRNA genes in determining marine microbial diversity. In this study, the DNA fingerprinting method will be discussed and its advantages in determining microbial diversity and removing the mucilage layer will be stated.

Keywords: biofilm, DNA fringerprinting, mucilage, seawater, VBNC.

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Investigation of Genotoxic Effects of Some Nitro-Compounds Designed as Pro-Drugs

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Abstract

Nitro-compounds are involved in the structure of many agents that we encounter in daily life. Especially, most of the drugs used in therapy are theoretically nitro-compounds due to some positive electrochemical properties, and many of them are used in high daily doses for long periods of time. However, studies with these compounds have also shown that they may have genotoxic potential that may affect human health. Therefore, it is important to evaluate these compounds in terms of their genotoxicity.

In this study, nitro-compounds from three different groups synthesized as drug active ingredient (benzoic acid, benzimidazole and β-methyl-β-nitrostyrene derivatives) were studied. The genotoxic potentials of these compounds, which were evaluated in terms of their antifungal and antimicrobial properties after their synthesis and positive results were obtained, were evaluated in this study with the umu-microplate test system. In the umu-microplate test system where SOS inducing activities were evaluated, 3 strains sensitive to nitro compounds were used: *Salmonella typhimurium* NM1011, which overexpresses the nitroreductase (NR) enzyme, *S. typhimurium* NM2009, which overexpresses the O-acetyltransferase (O-AT) enzyme. and *S. typhimurium* NM3009, which overexpresses both the nitroreductase (NR) enzyme and the O-acetyltransferase (O-AT) enzyme. Chlorophenol-red-β-Dgalactopyranoside (CPRG) was used as a substrate in the enzyme incubation medium and 4-nitroquinoline 1-oxide (4NQO), known to be a genotoxic agent, was used as a positive control. For all compounds, the induction of umuC gene expression was almost similar across the three strains. The tested compounds did not cause a significant induction in these three strains that overexpress nitroreductase and O-acetyltransferase enzymes involved in the metabolic activation mechanism of nitro compounds. Therefore, according to the obtained data, it can be said that these compounds do not have genotoxic potential. The absence of genotoxic activity of any of the compounds is important as a positive data in their evaluation as drug candidates and is promising for further studies.

Key Words: Nitro-compounds, Umu-Microplate Test System, Genotoxicity, Benzoic Acid, Benzimidazole, Nitrosiren Derivatives

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Effects of Vitamin D3 on Some Biological traits of *Drosophila melanogaster* (Meigen) (Diptera: Drosophilidae)

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Kemal BÜYÜKGÜZEL[2]

Abstract

Effects of vitamin D3 (VD3) on some biological traits of *Drosophila melanogaster* (Meigen) (Diptera: Drosophilidae) were investigated in this study. Preliminary feeding experiments firstly were done by determining concentrations of VD3 with a wide range of the vitamin. Previous insect rearing researches on artifical diet with VD3 were used to the concentration ranges of the vitamin. The treatments were done in the preliminary experiments considering six concentrations of VD3 (5, 20, 80, 320, 1280 and 2560 mg/L). Three control were used: (1) control diet without VD3 and solvents (CD), ; (2) solvent control (SC; 1% tween 80 and 3% ethanol) and negative control (NC; ultrapure water). In the preliminary experiments, it was determined that the development of the insect into the 3rd stage larva, pupa and adult stages of the insect was prevented at the concentrations of 1280 and 2560 mg/L of VD3 added to the diet observing none of the larve reached 3rd-instar. It was observed that 90% of the 1st stage larvae left on the diet in the control diet group (without vitamin VD3 and solvent), reached the 3rd larval stage, pupal and adult stages. Among the tested concentrations, at 5 mg/L, percentage of the larvae reaching 3rd larval stage was 85%, the rate of pupation was 75%, and adult emergence was 75%. It was determined that the rate of adult emergence decreased to 35% at both 80 and 320 mg/L concentrations of VD3. Considering the development times of the insect, it was determined that the developmental time to reach 3rd larval stage was 3.38, the time to pupal sateg was 4.16, and the time to adulthood was 8.16 days in the control diet group. The results showed that that while survivorship was decreased by increasing contrations of VD3, the developmental time of the insect was not significantly affected by this vitamin.

Keywords: *Drosophila melanogaster*, vitamin D3, survivorship, development

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DLC Coating Wear Detection Using Image Recognition Technique by Artificial Intelligence

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Abstract

In order to inject the fuel into cylinder of a diesel engine by an injector, the needle inside the injector nozzle must be opened and closed very quickly. During these movements, the needle is in contact with the nozzle body. Due to this contact, the needle is coated with DLC (Diamond-like carbon) coating to minimize the friction between the metals (needle-nozzle body) and to prevent the damage by wear. However, due to the high loads at the engine or vehicle operating conditions, this DLC coating can be removed from the needle surface and this can seriously affect the injection quantities. Therefore, validation tests of related engine needs to be conducted and after that, needle coating inspected in detail visually. The main target of this study is to detect this failure (wear) and wear ratio on the needle seat area by using artificial intelligence image recognition techniques. Thus, a data set was created by using 967 needle images and labeling the area where the failure occured (needle seat area) and the wear on this area. A model was created and trained by feeding this prepared data set to U-Net architecture which is a convolutional neural network used in medical image classification. The area where the failure occurred (needle seat area) and the failure (wear) were taught to this model. After the model can detect the wear on the needle seat area from the images, it has been developed to calculate the wear ratio as percentage.

Keywords: Diesel Injector, DLC coating, Wear, Artifial Intelligence, Picture Recognition.

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Spermatozoa Cryopreservation of Sex-Reversed Rainbow Trout (*Oncorhynchus mykiss*): The effect of dilution rate and a N-(2-Mercaptopropionyl)-Glycine-based Extender on Sperm Motility and Fertilizing Capacity

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Erkan CAN[2]
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Abstract

In recent years, breeding studies have accelerated in aquaculture in terms of growth, resistance to diseases, and survival rate. In this context, it is important to establish all female (XX) Salmonid populations. In this study, sperm motility, fertilization rate and opening rates were tried to be determined after freezing, storage and thawing of semen taken from sex-reversed (XX) rainbow trout (Oncorhynchus mykiss). In order to prevent damage to sperm quality during freezing, dilution at different ratios (1:9, 1:15, 1:25) together with different doses of 0 mM Control, 1 mM, 2 mM and 4 mM antioxidant (N-(2-Mercaptopropionil) -Glycine) was added to the main diluent. As the main waterer; Glucose (0.3 M), DMSO (10%), egg yolk (11%), Penicillin/Streptomicyn (0.3%)] were prepared. The prepared sperm and diluent mixture was drawn into 0.5 ml straws, frozen and stored at -196°C. Straws (0.5 ml) were thawed in a 37°C water bath for 30 seconds. Post-solution motility time, fertilization rate and opening rate were determined. The results obtained were the best concentration ratio of N-(2-Mercaptopropionyl)-Glycine, motility (76.3±3.21), fertilization (63.33%±2.10) and hatching (53.33%) ±2.90) for a concentration of 2 mM and a dilution ratio of 1:25. In conclusion, N-(2-Mercaptopropionyl)-Glycine provided improvements during the sperm cryopreservation process and it was determined that it could be used as a protective agent..

Keywords: Sex-reversed, N-(2-Merkaptopropionil)-Glycine, kriyoprezervasyon, sperm, rainbow trout.

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The Contrıbutıon of Roof Solar Panels Supply Chaın Localızatıon To The Economy And Employment In Turkey

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Mehmet Özgür KAYALICA[2]
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Abstract

Energy is one of the basic needs that must exist in order for humanity to continue its generation. Humanity has turned to renewable energy sources with the awareness of the damage caused by non-renewable energy sources to the environment and that these sources will not be able to meet the increasing energy demand in the near future. Perhaps one of the most basic of these energy sources is solar energy, which will never run out. This study was carried out to examine the possible contribution of the increase in the domesticity rate of roof solar panels to the country's economy and employment. In this study, where the panel locality rate of the country was taken as 58%; scenario analyzes were made by increasing the panel ratio by 70%, 85% and 100%, respectively. The I-JEDI (International Relations and Economic Development) model was used for scenario analysis. The I-JEDI model is an economic model that evaluates the gross economic impacts from energy facilities such as wind, solar, geothermal in various countries. The I-JEDI model is a linear model; therefore, 10 MW has been chosen as the project size. Inverter locality rate is taken as 100%. When the direct effect on the economy is analyzed, the 1% increase in the domesticity rate of the panel contributed $4506.27/MW to the economy. When the indirect effect of the increase in panel domesticity on the economy is examined; The effect of 1% increase in panel domesticity was $1083.62/MW. A 1% increase in panel domesticity created 2.28 jobs per MW. In the indirect job creation part, the 1% increase in panel locality provided 0.62 jobs per MW. As can be seen from the inferences made; The increase in the panel locality rate had a positive impact on the economic impact and employment.

Keywords: employment, localization, solar PV, economic impact, scenario analysis

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Analysis of the Charge Transport Properties of Bis Chalcone Derivative from the Reorganization Energy, Band Gap under the Different Electric Fields and Results of Bond Length Alternation for Efficient Organic Field Effect Transistors

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Abstract

Here in, we explored the optical, electronic and charge transport properties of π-conjugated bis chalcone derivative molecule through quantum chemical calculations for the organic semiconductor devices. To obtain further understanding of the charge transport properties of studied compound, we compared the results with the physical properties of molecules included the thiophene rings in the literature. We performed Marcus Electron Transfer Theory and determined the reorganization energy, value of the electron affinity and iyonization potential, bond length alternation values (BLA) of the compound. To determine their suitability for the use as a conducting channel in organic semiconductor devices, the behavior of HOMO, LUMO and band gap were carried out under the different electric field. The main concept of this study is that the charge transport property therefore charge mobility strongly depends on the reorganization energy and the durability of organic electroluminescence devices depends on ionization potential and electron affinity of the molecule. In addition, the bond length alternation of the compunds were calculated by using the optimized geometries of neutral, anion and cation states since reorganization energy is strongly depends on the geometry changes, Our calculated results demonstrate that the charge carriers for the molecule are electrons and the molecule has the smallest reorganization energy which enhance efficient mobility therefore device performance among the reported similar molecules. Also, the incorporation donor and acceptor group to conjugated skeleton improve the effiecient charge injection in electronic devices. We hope that this study shed light on molecular design for an n-type semiconductor bis chalcone derivatives with the small reorganization energy.

Keywords: bischalcone, charge transport rate, organic semiconductors, crsytallography, optoelectronic

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L2$_1$ and XA Ordering Competition Ti$_2$CoZ (Z = Al, Si, P) Full-Heusler Compounds

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Abstract

A theoretical investigation of the electronic and magnetic properties of the L2$_1$ and XA structures of Ti$_2$CoZ (Z=Al, Si, P) Heusler compounds was carried out using the ab-initio FPLO method. Calculations were performed using the generalized gradient approximation (GGA) to the exchange-correlation potential. Initially, we determined the ground state. We performed total energy calculations as a function of the lattice constant for both L2$_1$ and XA structures assuming several magnetic phases (ferromagnetic, antiferromagnetic, nonmagnetic and several possible ferrimagnetic configurations). Our results suggest that We found that for all Ti$_2$CoZ (Z=Al, Si, P) Heusler compounds the L2$_1$ structure is more stable than the XA one. Further, we observed that at the equilibrium lattice constant in the L2$_1$ structure the total spin magnetic moment (Mt) of is 2.00mB, 2.553mB and 1.767mB for the Ti$_2$CoAl, Ti$_2$CoSi, Ti$_2$CoP compounds respectively. At the equilibrium lattice constant in the XA structure the corresponding total spin magnetic moments (Mt) are 2.00mB, 3.00mB and 2.185mB. Our results show that Ti$_2$CoAl and Ti$_2$CoSi Heusler compounds in the XA structure follow the Slater-Pauling rule connecting Mt with the total number of valence electrons in the unit cell, while Ti$_2$CoP deviates. In the L2$_1$ structure only Ti$_2$CoAl follows the Slater-Pauling rule. Ti$_2$CoAl, Ti$_2$CoSi and Ti$_2$CoP compounds exhibit half-metallic, spin-gapless semiconducting and metallic behaviour, respectively, when grown in the inverse XA structure. When the Ti$_2$CoAl, Ti$_2$CoSi and Ti$_2$CoP compounds are grown in the L2$_1$ structure, they exhibit half-metallic, metallic and metallic behaviour, respectively.

Keywords: Heusler Compounds, Magnetic Properties, Electronic Band Structure, FPLO, GGA

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Optoelectronic Properties of Ag/Ge:40%W/p-Si/Al Photodiode Under Different Light Intensities

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Sıtkı AKTAŞ[2]
Mustafa Şükrü KURT[3]

Abstract

In this study, 40% tungsten doped germanium thin film was deposited on the p-Si/Al wafer using co-deposition technique via magnetron sputtering method. Afterwards, Ag rectifier contacts were grown on the thin film and Ag/Ge:40%W/p-Si/Al photodiode was fabricated. The optoelectronic properties of the fabricated photodiode were investigated at ±2V potential range under dark and different light intensities (20-100mW.cm^{-2}). Diode ideality factor (n), barrier height (ϕ_b) and reverse saturation current (I_0) values which are parameters for photodiodes, were determined from thermionic emission theory (TE) and series resistance (Rs) values were determined from ohm's law. As n values were determined as 2.46, 2.38, 2.63, 2.83, 2.54, 2.77, ϕ_b values were 0.489, 0.491, 0.485, 0.483, 0.488, 0.484eV and I_0 values were 0.98, 0.91, 1.13, 1.24, 1.02, 1.21x10^{-3}A under dark and 20, 40, 60, 80, 100mW.cm^{-2} light intensities, respectively. Additionally, the Rs values were as 13.17, 15.79, 12.74, 10.54, 11.49, 12.64Ω. The lowest n values and Io value and the highest ϕ_b value and Rs value were observed at 20mW.cm^{-2} light intensity. With the increase of light intensity, n and ϕ_b values decreased and increased with zigzag, respectively. It is seen that the calculated n values were far from the ideal value of 1. The reason for this difference could be explained with interface states, series resistance effect and undesirable oxide layers formed at the interface. The photovoltaic properties of Ag/Ge:40%W/p-Si/Al photodiode were examined and the Voc and Isc values were found to be 0.021, 0.0218, 0.015, 0.0195, 0.0205 0.0182V and 9.04x10^{-4}, 9.10x10^{-4}, 6.01x10^{-4}, 9.06x10^{-4}, 9.11x10^{-4}, 7.94x10^{-4}A, respectively, under dark and light intensities. Also, %FF values were calculated as 0.30, 0.32, 0.28, 0.30, 0.31, 0.30 and the highest FF% was obtained under 20mW.cm^{-2} light intensity. Consequently, it is stated that the fabricated heterojunction exhibits photodiode and photovoltaic behaviours and offers an alternative to optoelectronic applications.

Keywords: Heterojunction, W doped Ge, Optoelectronic, Photodiode, Diode parameters

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Detection of Human Errors with HAZOP and Analyzed with HEART in a Chemical Facility

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Abstract

As the production and use of chemical products, which are an important indicator of industrialization, increases, there is a significant increase in the number of occupational accidents, the root cause of which is human errors. While human errors negatively affect production and profitability, they can also cause accidents. In order to prevent accidents, necessary measures should be taken to correctly identify human errors, analyze detected human errors, and eliminate or minimize these errors. In this study; possible faults that may cause an accident in a facility producing chemicals were determined by the Hazard and Operability Analysis (HAZOP) method, which is the most preferred method in determining hazards in the chemical industry. Then, among these errors, human-induced operator errors were determined. In order to determine the order of importance of the human errors detected by the HAZOP method, the human errors detected using the Human Error Assessment and Reduction Technique (HEART) were digitized. In the analysis made, the intervention error to be made by the operator against the decrease in nitrogen tank pressure was determined as the highest human error.

Keywords: Human Error, Human Error Analysis, Occupational Accident, HAZOP, HEART

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A novel approach to Safety Engineering: Fuzzy Logic Based Safety I-II-III Integrated Risk Assesment

Emin TARAKÇI[1]
Emine CAN[2]

Abstract

Safety engineering is a contemporary approach to understand and analyze complex systems. FRAM could be applied to define all process of healthcare facilities to cure healthcare professionals and patient safety. The aim of this article is to describe an approach to explore the all process of C-19 management in healthcare facilities from Safety-I-II-III perspectives and describe the added value of this to pandemic management strategies.

FRAM is a method to analyse how a system, organization or activity is affected by variabilities, to investigate the cause of failures.

An FMEA is a design and engineering tool which analyzes potential failure modes within a system to determine the impact of those failures.

The structured applicability of this novel approach to FRAM is provided by integrated to Safety-I, Safety-II and Safety-III by using fuzzy logic. It is analyzed using fuzzy logic to optimize decision makers and degrees of parameters in complex systems and disaster scenarios.

The approach developed in the doctoral thesis[a] is an introductory step to illuminating how to explore, analyse and observe all process of the healthcare facilities in disaster scenarios like pandemic period. This provides a new novel approach by fuzzy logic with a structured methodology to apply on Safety-I, Safety-II and Safety-III to ameliorate healthcare professionals and patient safety.

Keywords: Safety-I, Safety-II, Safety-III, Fuzzy Logic, FRAM, FMEA, Safety Engineering, Risk Management, Healthcare Facilities, Patient Safety

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[a] This study was produced from the doctoral thesis prepared by the first author under the supervision of the second author.

Using Caricatures as a Method to Raise Awareness for Disability

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Abstract

"Universal design" is defined as the design of products, environments, programs and services which are able to be used by the majority of people without the need for special additional design or regulation. Universal design principles should not be a necessity to fulfill the legislation. It should be perceived as applications made to facilitate the life of individuals and to make the individuals happier by developing appropriate solutions to the problems in the natural flow of life. One of the biggest problems we face in practice is to raise awareness. Today, although studies on awareness have increased rapidly both through mainstream media and social media, it is not possible to say that sufficient results have been obtained. In this study, the caricatures that are able to be used as a tool to raise awareness will be examined. Caricatures are able to express different emotions among the readers and create a discussion environment, while they reflect the feelings of the artist who drew them. Caricature is defined as "a excogitative and humorous picture that exaggerates all kinds of events related to human and society". Caricatures that send a message much faster than reading help to think critically and understand prejudices. However, the aim of this study is studying the caricatures concerning the effects they create on the target audience rather than studying them conceptually. Caricatures are linear drawing that aim to make people laugh and think. That's why they are interesting on a large scale. Since they are interesting, it is thought that they are able to be used in almost every age group that start from primary education with the aim of raising awareness on the disabled. Caricatures about the disabled should have an explanatory-illuminating and excogitative function. The caricatures are examined in this study Iwith regard to the effects they reveal. These effects are able to be classified as giving people pause, motivating the disabled people, developing empathy and respect for the disabled. İzmir Metropolitan Municipality, which organizes competitions on the caricatures for the disabled, also held a National Caricature Contest on "Prejudice and Empathy" for the problems of the disabled and the solutions within the context of the "4th International Barrier-Free İzmir Congress" in May, 2021. Undoubtedly, it will be very beneficial to increase the number of these competitions and to use their outputs to raise awareness on different platforms.

Keywords: Universal Design, Disability, Awareness, Caricature, Empathy

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A Study on Sustainability of the Rural Heritage: The Case of Gölcük-Nüzhetiye Neighborhood

Fatma Azize Zülal AYDINOL[1]

Abstract

Nowadays, as a result of factors such as population growth acceleration, rural-urban migration, differentiation of consumption habits, technological advancements in construction technologies, and easy access to materials, the number of reinforced concrete buildings increases, and the constructed areas resemble each other day by day, and the regions lose their unique and local identity and pattern. Monotype and faceless structures abound in rapidly growing cities. In our country's rural settlements, buildings that are compatible with their physical and social environments, have their own identities, and are built with folk architecture are fading day by day. The number of reinforced concrete buildings that trivialize local materials and lack the features of their environments is growing.

The experts discuss the current and future settlement problems in both urban and rural areas and the improvement suggestions and consider that the practices in rural settlements may be a solution in this regard. These settlements, which can differentiate and adapt to the physical environment and societal structure, and where correct planning decisions are applied, and vernacular architecture is commonly used are put under the scope.

Within this scope, the general situation of traditional buildings in Nüzhetiye Neighborhood, Kocaeli Province, Gölcük District, that stand out due to their historical background, cultural property, and unique nature is examined, considering rural and vernacular architecture. The 2018 field research was carried out on the buildings examined in the same region, which were also included in the book named Gölcük Architectural Heritage in 2013. The present study, which compares the past and the present and includes the documentation of the final situations of structures, is thought to contribute to the preservation of the region's rural architectural heritage.

Keywords: Conservation, Gölcük, Nüzhetiye, Rural Architecture, Rural Heritage

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An Overview of the Geodynamic Features of the East Anatolian Plateau

Ebru ŞENGÜL ULUOCAK[1]

Abstract

The Eastern Anatolian Plateau, located in the Arabian and Eurasian continental-continental collision zone in the Alpine-Himalayan orogenic belt, is dominated by soft collision processes following the removal of the Arabian oceanic lithosphere at the Late Miocene (~11 Ma) and subsequent ongoing hard collision with the Great Caucasus closure at its northern margin. Many studies, including two-dimensional numerical geodynamic models, have been conducted to investigate the evolution of the high plateau (~2 km) and lithospheric removal processes beneath the thick crust in the region. However, there is limited research that attempts to explain the region's current anomalous topography, intraplate tectonics and heterogeneous subsurface structures that may be modified by dynamic forces occurring in the upper mantle. The research presented here focuses on the isostatic equilibrium of the crust on the Eastern Anatolian Plateau and possible convective support from the upper mantle using geodynamic modeling studies and analysis of long-wavelength gravity data in combination with observed topography. For this purpose, a large number of three-dimensional thermomechanical numerical geodynamic models with different temperature, rheological and density variables are presented in this study. Three-dimensional variations of temperature and mantle convection vectors and crustal isostasy derived from gravitational admittance calculations with dynamic topography are shown here. My research results, interpreted together with geophysical and geological observations, provide an integrated analysis of the upper mantle dynamic forces beneath the Eastern Anatolian Plateau in terms of the geodynamic characteristics of the region.

Keywords: Geodynamics, East Anatolian Plateau, Earth Sciences, Modeling

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Determination of Concrete Water Content by Particle Swarm Optimization of GPR Trace

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Abstract

Ground penetrating radar (GPR) method, which is a non-destructive method, can be performed both economically and quickly compared to destructive methods. GPR method is used to reach information about qualitative and quantitative properties in concrete. In this study, the inversion of the ground penetrating radar trace was performed with the Particle Swarm Optimization (PSO) method to determine the water content of the concrete. The GPR data were collected by profile measurements at the top of the concrete block. Input data for PSO inversion was created by selecting the central traces that includes reflections due to the steel reinforcement placed perpendicular to the measurement direction in the concrete block. As a result of the inverse solution, the values of the relative dielectric constant, magnetic permeability and conductivity parameters, which are the dielectric properties of the top layer of concrete, steel reinforcement and the bottom layer of concrete, were calculated. The inversion result was obtained with an error rate of 6.26% according to the preliminary calculations. The variation of the relative dielectric constant values is directly related to the water content of the concrete. In this study, the relative dielectric constant value of the upper concrete layer was used to calculate the water content of the concrete. As a result of the inverse solution, the relative dielectric constant of the first layer was found to be 5.52. The water content on the third day was calculated as 6.97% considering the age of fresh concrete since pouring. In this way, the effects that may reduce the strength of concrete and reinforced concrete structures, such as water ingress and humidity in the concrete can be determined. One of the biggest contributions of the study is that it shows that this process can be performed non-destructively without disturbing the integrity of the concrete.

Keywords: PSO; Concrete; Water Content; Ground-penetrating radar.

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Analisys of Impact Performance of Repaired Radome after Birdstrike Structure

Güray ERTEĞİ[1]

Faruk Elaldı[2]

Abstract

In aviation sector, Radome which is located in front of air vehicle is frequently damaged due to bird strike during landing or take-off. Since the damaged area is structurally large, it is often repaired instead of replacement. Repair is more efficient in terms of life cycle cost.

While considering repair method, it is preferred to remove the damaged layer and replace it with a composite patch made of the same or similar parent materials. With this study, it is aimed to experimentally examine the performance of the repaired part after being exposed to the same low velocity impact again and to measure the availability of airworthiness.

Within the scope of the paper, to verify the performance of the repair, in the first step, tests were carried out by applying an average impact energy of 50 J for simulating bird strike in a low velocity impact test device. The test specimens were later repaired by means of single scarf technique and impact tests were repeated for the samples under the same conditions. As a result of this experimental study, it was indicated that the performance of the repair method based on the damaged area for the repeated impact simulating bird strike on the same location was found to be very close to the impact performance of the original radom part.

Keywords: Bird strike, Radome, Impact Analysis, Composite repair, Low-speed impact

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Determination of Fixed Wing Hybrid Unmanned Aerial Underwater Vehicle Concept Design Constraints and Configuration Selection

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Abstract

This study includes the examination of the historical development of hybrid unmanned air – underwater vehicles that can transit from water to air and from air to water, evaluating the solutions with the problems encountered, determining the design constraints and performance parameters, and choosing the configuration. As it is known, the use of autonomous unmanned vehicles in aviation and maritime technologies has become quite common. However, the hybrid vehicle which can fulfill the duties both of aerial and underwater vehicles, will bring advantages such as reconnaissance and surveillance in the air and underwater, hiding from zones, communicating between environments and it will provide superiority over an aircraft or watercraft. But both of the air and the underwater environment have their own requirements. Here the design constraints set for a hybrid unmanned aerial underwater vehicle that can fulfill needs along a certain mission route will determine the capabilities that the vehicle should have, and based on these constraints, performance parameters and concept design configuration selection will be decided. Accordingly, the configuration choices for the design of a fixed-wing hybrid unmanned underwater aircraft that will flight 10 minute with cruising speed of 20 m/s at 50 meter altitude, then land on the water, continue cruising on the water for 50 meter, dive to a depth of 3 meter and perform 3-minute underwater cruise mission here, then egress to the air environment and finish the mission route will be high wing, conventional tail, truck engine and monocoque body structure.

Keywords: UAUV, Hybrid UAV, Concept Design, Configuration selection, Design Constaints

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Pre-Treatment Of Cotton Textile Industry Wastewater with Coagulation-Floculation And Investigation Of Advanced Treatment With Photocatalytic

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Abstract

The effluent wastewater of a cotton textile company in Sivas was taken This wastewater was first pre-treated by coagulation and flocculationu using $FeCl_3$ as coagulant. During treatment with coagulation and flocculation, firstly the amount of coagulant and the precipitation time were kept constant and the pH value at which the coagulant substance was most effective was found. Then, experiments were carried out with different doses of coagulant by keeping the appropriate pH value and precipitation time constant, and the appropriate coagulant dose was obtained. Afterwards, experiments were carried out with appropriate pH and coagulant dose, samples were taken at different interval times and appropriate precipitation time was determined, and real textile wastewater was treated under these suitable conditions. According to these treatment results; color removal efficiency of 75.2-85.1%, SS removal efficiency of 88.1%, turbidity removal of 61.2% and COD removal efficiency of 69.7% were obtained. Finally pre-treated stock wastewater was obtained by coagulation and flocculation and further treated with using by photocatalytic reactor . Waste water pre-treated by coagulation-flocculation was firstly put into the reactor without any catalyst and its treatment was investigated. Then, starting from the initial moment when TiO_2 and ZnO catalysts and different doses of catalyst were added in the photocatalytic reactor, a sample was taken every 30 minutes intervals and the results were examined. According to these results, removal efficiency of pollutant parameters in the experiments was almost not determined in the reactor without the addition of catalyst. In the experiments performed with the addition of ZnO catalyst, the system in total; color removal efficiency between 98.9-99.4%, 100% SS removal efficiency, 99.9% turbidity removal and 90.6% COD removal efficiency were obtained. In the experiments carried out with the addition of TiO_2 catalyst, the system in total; color removal efficiency between 98.7-99.6%, 100% SS removal efficiency, 99.9% turbidity removal and 91.3% COD removal efficiency were determined.

Keywords: Coagulation-Flocculation, Color Removal, Textile Wastewater, $FeCl_3$, Photocatalytic, UV.

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Determination of Triclosan Sorption Capacity Onto Powder Activated Carbon by Batch Adsorption Experiments

Kadir ÖZDEMİR[1]

Abstract

As a result of industrialization and rapid population growth, there is a significant increase in micropollutant concentrations in aquatic environments. Pharmaceuticals, personal care products (PPC) and endocrine disrupting hormones (EDC) are often the most common contaminants in surface waters, wastewater discharges and sewage systems. In this paper, triclosan compound, which is an antibacterial product in cleaning products, was used as a micropollutant in experimental studies. In this study, the adsorption of triclosan compound, which is seen in surface and underground waters and wastewater discharges, on powdered activated carbon as a function of pH and ionic strength at laboratory scale was investigated. Experimental studies were carried out by adding certain doses of 1 g/L stock triclosan solution prepared in the laboratory. In order to determine the adsorbing capacity of triclosan, powder activated carbon was used as an adsorbent. As a result of batch adsorption experiments performed, the highest triclosan sorption capacity was observed at acidic pH values (pH =3; 6.75 mg.g⁻¹). Furthermore, triklosan adsorption capacity increased when the ionic strength was increased from 0.5 to 1.0 M. Meanwhile, the experimental results showed that the Freundlich equation about correlation coefficient (R^2=0.99) is the best isotherm model to describe the adsorption process as compared to Langmuir isotherm.

Keywords: Triclosan, pH, Ionic strength, Micropollutants.

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An Application of Distributed Order Differential Equations to a HIV Infection of CD4+ T-Cell Model

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Mevlüde YAKIT ONGUN[2]
İlkem TURHAN ÇETİNKAYA[3]

Abstract

Distributed order differential equations which can be considered as the general case of ordinary and partial differential equations in some way are very important subjects in mathematical modeling. Because, the density function encountered in the distributed order differential equations leads to better understanding to the dynamics of the disease in different circumstances in mathematical biology. So, in this study, we prefer to present an application of distributed order differential equation on an epidemic model of human immunodeficiency virus (HIV) infection of CD4+ T cells. An efficient method called Nonstandard Finite Difference (NSFD) scheme is applied to discrete the distributed order differential equations of HIV model. Grünwald-Letnikov derivative formula is considered during discretization. It is aimed to present the behavior of the model. For this reason, the equilibrium equations of the model are obtained. The Jacobian matrix of the distributed order HIV model is determined with the help of discrete system. Considering Schur-Cohn criteria, the stability of the model at the equilibrium points is analyzed. It is shown that the results obtained for the distributed order differential equations are in accordance with the results obtained in the case of ordinary derivation of the HIV infection model in literature. The stability of the model in different circumstances is examined by using density function. Also, to show the efficiency of the NSFD schemes, the results are compared with other numerical methods for different step-size.

Keywords: Distributed order differential equations, HIV infection model, Nonstandard Finite Difference schemes, Numerical analysis, Stability analysis.

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On Skew Constacyclic Codes over Ring B_q

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Abdullah DERTLİ[2]

Abstract

Linear codes have been studied in coding theory for last six decades. At the beginning, a lot of research on error correcting codes are concentrated on linear codes over finite fields. Since the revelation in 1994, there has been a lot of interest in codes over finite rings. The structures of certain type of codes over many rings have been determined such as negacyclic, cyclic, quasi-cyclic, constacyclic codes. Many methods and many approaches are applied to produce certain types of codes with good parameters and properties. Some authors generalized the notion of cyclic, quasi-cyclic and constacyclic codes by using generator polynomials in skew polynomial rings. The skew polynomial rings are an important class of non-commutative rings. The class of these type codes is more bigger than the others. Many good codes were also obtained from them. In this paper, we introduce skew constacyclic codes over the finite ring $B_q = F_q + v_1 F_q + v_2 F_q + v_3 F_q + v_4 F_q + v_1 v_2 F_q$ by defining non-trivial automorphism on these rings, where, $v_i^2 = v_i$, $v_1 v_2 = v_2 v_1$, $v_i v_j = 0$, $1 \leq i \leq 4$, $j = 3,4$, $i \neq j$ and $q = p^m$, p is an odd prime. We investigate the structural properties of them. We decompose a skew constacyclic code over B_q into six skew constacyclic codes over F_q. We define a new Gray map from B_q to F_q^6. The Gray map is a weight preserving map and is also an isometry.

Keywords: Finite rings, Constacyclic codes, Skew constacyclic codes.

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A Classification Approach to Determinate Customer Preferences in the Real Estate Industry

Kamil Çayırlı
Umar İgan
Zafer Sever
Erim Ertürk
Okan Örsan Özener

Abstract

Keywords:

Characterizing The Properties of Huntite-Hydromanesite Added Coated Fabric In Different Particle Sizes

Zafer KILIÇ[1]
Oğuz DEMİRYÜREK[2]

Abstract

Flame retardancy has become a desired feature in areas such as automotive, home textiles, building textiles, firefighter's clothing. This feature is achieved by the use of fibers such as carbon, glass, aramid in the fabric structure; It can be achieved by giving flame retardant chemicals to the fabric during dyeing or finishing, or by transferring flame retardant minerals to the fabric by coating. It is known that minerals such as Huntite and hydromagnesite, which are extracted within the scope of mining activities in our country, provide flame retardancy. These minerals are generally used in the plastics industry to increase the flame retardancy of plastics.In this study, it is aimed to improve human health in terms of flame retardancy, which aims to reduce the deadly damages of fires that directly affect human life. Because although traditional flame retardants make it difficult to ignite due to the halogens they contain, they can also cause death outside of fire, as they release toxic gases during combustion. Since Huntit Hydromagnesite is mineral-based, it does not cause any toxic gas emission, so it is a material that is both suitable for human health and harmless to the environment. In this respect, the Huntite-Hydromagnesite material used in our study is one of the first studies in the field of textile. The fact that the mining activities of this substance are carried out in our country will also provide a national value gain.

Keywords: Flame Retardancy, Huntite, Hydromagnesite, SEM, TGA

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The Role of Village Design Statements in Protecting Rural Landscapes

Betül TÜLEK[1]
Selin ERDOĞAN[2]

Abstract

The largest settlements of rural landscapes are villages in Turkey. According to the Village Law of 1924, the village concept is a settlement with a population of less than two thousand, consisting of people living in collective or scattered houses with common goods such as mosques, schools, pastures, coppices, together with their vineyards, gardens and fields. Villages are such an areas that need to be protected in order not to lose their identity in rural landscapes. Village design statements also come into play at this point.

Village design statement is a document containing recommendations on the sustainability of rural characters. The primary purpose of the village design statement is stated as preserving the originality of the village for rural development, improving the quality of life, providing economic vitality to the village and realizing all these with a new decision-making environment at the local level. Village design statements have a unique structure in every field. The public has the right to speak in the project to be implemented. Indication of deficiencies or issues that are desired to be developed in the environment in which they live gives a significant direction to the statements. Village design statements play a major role in making the relationship between nature and human being more sustainable. At the same time, they play an important role in establishing a bond between the urban and rural communities.

This study aims to evaluate the village design statements within the framework of landscape protection and landscape planning approaches with different pilot area examples from Turkey. It is planned to contribute to the determination of the village design statements importance in preserving the original/authentic textures of rural landscapes by examining the studies carried out in the determined pilot areas.

Keywords: Rural Landscape, Planning of Rural Landscape, Landscape Protection, Village Design Statements, Turkey

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Classification of EEG Data with Machine Learning Techniques

Erdem TUNCER[1]

Abstract

One of the data sets in which machine learning techniques are frequently used is Electroencephalography (EEG) data. EEG is the process of measuring and recording the electrical activity in the brain. EEG data is used to identify epilepsy and other brain signals. It is important to detect epileptiform activities and other brain signals observed during epileptic seizures from EEG. Accurate classification of EEG waveforms is essential for an accurate diagnosis of epilepsy. This process is important because it contributes to the determination of epileptic seizures and other epileptic EEG activities. In this study, the free Bonn University data set, which is frequently used in the literature, was used for the diagnosis of epilepsy disease. Binary classifications (A-D, A-E, A-B, A-C, B-E, C-E, D-E, ABCD-E) were made with these data sets. The data was divided into 2-second epochs, and each epoch was classified separately within itself. By using the discrete wavelet transform from each window, the coefficients in the 4 sub-frequency bands were obtained with the Daubechies-4 (DB4) main wavelet. Eight features were extracted separately for each channel. Binary classification has been made with both traditional and deep learning architectures and the contributions of these methods to the classification success have been compared. In the A-E classification problem, the highest success rate (100%) was achieved with both Long Short Term Memory (LSTM) and K-nearest Neighbors-3 (KNN-3) algorithm models. The lowest success rate was achieved with the KNN-3 classification model (83.12%) in the ABCD-E classification problem. Among the classification problems, the average success rate was determined as 94.94% with the LSTM model and 93.70% with the KNN-3 model. It has been demonstrated in this study that generally more successful results are obtained with the deep learning architecture compared to the traditional classification architecture.

Keywords: Artificial Intelligence, Classification, Electroencephalography, Epilepsy, Machine Learning.

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Tisaş Process Management with Process Improvement Methodology

Betül ERTAŞ BEKÇİ

Abstract

Keywords:

Investigation of Manufacturability of Cardiovascular Stent Material with Resin 3D Printer

Bünyamin ÇİÇEK[1]

Abstract

In this study, a new cardiovascular stent design was fabricated with ultraviolet light-cured resin. A new cardiovascular stent was designed with support from the literature. The drawing of the design was made in the SolidWorks program. A design with a diamond slice was produced as a sample by making a belt with a 1 mm strip at both ends. The Chitubox 64 program was used as the interface in the productions made with a resin 3D printer. Cardiovascular stent samples produced with a resin structure with known biocompatibility were successfully obtained by cytotoxicity test. Cardiovascular stents were produced with a resin 3D printer with an efficiency of up to 95%. Deformed or broken products were not included in the evaluation. The flexibility and reversibility of the produced cardiovascular stent samples were investigated with a simple experimental setup. cardiovascular stent specimens showed successful results in experiments repeated 3 times with a constant load of 500 g and a constant time of 1 min. Thus, new design cardiovascular stents were produced with a resin 3D printer. In addition, the flexibility of cardiovascular stents during a surgical operation was interpreted by examining their ability to be flexible and return to their original shape.

Keywords: Resin 3D printer, cardio vascular stent, polymer.

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Alginate Added TEMPO Oxidized Nanofibril Cellulose Based Aerogels: Investigation of Basic Properties

Orçun Çağlar KURTULUŞ[1]
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Abstract

Nano scaled cellulosic precursors (Nano crystal cellulose-NCC, Nanofibrillated cellulose-NFC, Bacterial cellulose-BC) are promising and attractive materials for different specifically useful areas due to its own specific properties from the point of both academicals and industrial researches. One class of this material called NFC is provided by mechanical disintegration of wooden cell wall by different techniques just after pretreatment of cellulosic fibers by and/or chemical, enzyme, mechanical attractions. Such as cellulose, alginate (Alg) is another biopolymer which widely being used in medical wound dressing applications in different forms basically because capability of ion exchange with wound area. This study basically present determination basic specific properties of NFC-Alg based foams such as liquid absorption, water vapor permeability (WVP), degradation in PBS (phosphate buffered saline) solution addition to antibacterial efficiency and biocompatibility for investigate of related material as suitable or not in medical process especially wound dressing. For this purpose, NFC was prepared by homogenization after chemical treatment of TEMPO (2,2,6,6, tetra methyl piperidine N oxyl) oxidation mechanism. After addition of different amount of Alg into NFC matrix, gelous phase was mixed, cooled and lyophilized to obtain aerogels. According to results, high level of both water and PBS absorption values were determined as range of 706%-1029% and 1203%-1579%, respectively. WVP results also showed high efficiency of vapor transfer by means of highly porous structure calculated between 2888%-3868%. Addition to this, all aerogels had sufficient biocompatibility (%70<) according the ISO-EN- 10993-5, however low rate or no bacterial resistance versus gram positive bacteria strain *S. aureus* which provide proper specification for using especially in biomedical applications.

Keywords: Nanofibril cellulose, Alginate, Oxidation, Aerogel, Biomedical

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Dominant Colors in Natural Daylight and Chromofors that Cause them of the Color-Changed Gem Diaspore [Al(OH)O] Crystals from Türkiye

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Evrim ÇOBAN[2]

Abstract

Special species of diaspore [Al(OH)O] are highly valued gem-market due to their fancy optical phenomenon. Unlike ordinary diaspore mineral, which is the main component of bauxite rock with an opaque microscopic structure originating from metamorphic formation, greyish-whitish and yellowish colors, the formation of diaspore mineral of hydrothermal formation origin in transparent-translucent macroscopic structure of gemstone quality is only commercially available in Muğla (Türkiye) region in the world. These diaspore crystals, which have been mined since the early 1970s, are considered as one of the gem-quality materials that change color according to the best light source in the world. In addition, these diaspore crystals also show V-shaped twin structures. These crystals are also mainly in chloritoid, donbassite, goethite, rutile, ilmenite, specularite-hematite, muscovite-margarite and calcite paragenesis. Diaspore crystals are found only in the fissure zones of karst-type diasporic bauxites in the region, and since this region is the only one in the world, it may be appropriate to call them gem Turkish diaspore crystals. The crystals show four dominant colors in natural daylight or strong fluorescent light: olive oil green, scarlet red, eggplant purple and brownish as well as some bicolour including greenish, yellow, dark and light eggplant purple colors. Chromophores that cause this color diversity are iron-titanium (Fe^{2+}-Ti^{3+}), manganese-iron (Mn^{2+}-Fe^{3+}), chromium (Cr^{3+}), and vanadium (V^{3+}) elements.

Keywords: Color-changed diaspore, Gem Turkish diaspore crystals, Chromophores, Meta-bauxite, Muğla (Türkiye)

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The Analysis of Solid Waste in Muğla Province in the Urbanization Process

Bahar İKİZOĞLU [1]

Abstract

Due to industrialization and urbanization, resources are consumed disproportionately, and significant waste are discharged as a result. The increasing waste volume affects the nations, societies, families and individuals. Waste is not only an environmental problem, but also an economic loss. Therefore, it is very important to determine the amount of waste at its source and to determine its recyclable part.

Muğla province, which is included in the Aegean Region of the Republic of Turkey, is famous for its holiday regions such as Ortaca, Dalaman, Fethiye, Marmaris, Datça and Bodrum, with a small part of its lands entering the Mediterranean Region. Located in the southwest of Turkey, Muğla is surrounded by Aydın in the north, Denizli and Burdur in the northeast, Antalya in the east, the Mediterranean Sea in the south and the Aegean Sea in the west. The present study aimed to determine the types of solid waste and the volume of each waste type generated in the Muğla province, and to analyze the recycling possibilities of these waste. Thus, the study aimed to determine the current status of solid waste production in Muğla province in the urbanization process. The study findings demonstrated that the waste collection and disposal processes employed in Turkey were also adopted in Muğla province.

Keywords: Recycling, Muğla, urbanization, solid waste, waste management.

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Blind Signal Detection and Parameter Estimation for Broadband and Multi-Channel Radio Communication Systems

Hüseyin Kemal ERTUĞRUL[1]
Ali GÖRÇİN[2]

Abstract

The need for communication, which has been one of the most important needs of humanity since the first ages, will continue in the future as today. As a result of the fact that wireless communication is preferred by the end users due to its many benefits, with the increasing demand for communication day by day, the natural, valuable, and scarce radio frequency resource that forms the basis of wireless communication should be used more efficiently.

In the report titled "FCC Report of the Spectrum Efficiency Working Group" published by the Federal Communications Commission (FCC), it is stated that licensed bands are used less than 10% [1]. When licensed frequencies are not in use, secondary (less priority) users can use licensed frequencies, which will increase efficiency in frequency usage.

As a result, secondary users need to measure frequencies quickly and precisely before and during use. Therefore, fast, reliable and widespread measurements are extremely important for the smooth communication of the primary (priority licensee) user. Within the scope of the energy detection approach, which gives fast, reliable results with ease of measurement, in the method proposed in this paper, firstly, power spectral density graph (power density/frequency) is obtained for broadband and multi-channel radio communication systems. Then, it determines the noise level by running the filter, histogram and decision algorithms, respectively, without relying on prior knowledge over this graphic data. Afterwards, empty and full bands are detected and the technical characteristics of these bands (bandwidth, signal-to-noise ratio, center frequency) are determined.

Keywords: Blind Identification, Signal Detection, Parameter Estimation, Cognitive Radio

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Emission Removal and Waste Minimization in Chemical Fertilizer Production

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Abstract

Fertilizer production in the agricultural industry is of vital importance due to the increase in the human population. Accordingly, a significant amount of deficit regarding greenhouse gas emissions arises in each chemical fertilizer production. Various research studies have been put forward to date in order to mitigate the greenhouse gas emissions. These removal methods, whose applicability is open to debate on an industrial scale, pose a question mark for the manufacturer. Although these waste removal methods are sometimes in the form of catalyst use in the production process, they occur in the form of precipitation of waste gas by scrubber method and heavy metal removal. In this study, the catalyst and precipitation method used by the researchers for waste gas minimization and the removal methods of greenhouse gas emissions are discussed and alternative solution methods are presented.

Keywords: chemical fertilizer production, waste gas removal, scrubber, catalyst

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Soft Topological Spaces and Soft Sets

Ümit CAN[1]

Abstract

In my study, the concepts of soft set and soft topological space were examined. Let be the initial universe and the set of parameters. By mapping each subset of lone and lone to ye, the pair is also called a soft soft set. In other words, this is a parametricized subset family of the soft set. Each set of sets can be thought of as the element set of the soft set from this family or the approximate element set of the soft set. The general properties of soft topological space were reminded, the previous studies on connection and disconnection in soft topological spaces were examined, and a new theorem was added, and some results were discussed and exemplified. Let be a soft topological space. So the boundary of every soft subset different from X is different from the empty soft set.

Be a soft topological space. The following premises are then equivalent:

(i) is soft disconnected space.

(ii) There are both open and closed soft sets in X and outside of X.

(iii) The boundary of a soft set different from X and in X is the soft empty set.

Keywords: Soft set, soft topology, soft connectivity-disconnection

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TİSAŞ Process Management with Process Improvement Methodology

Betül ERTAŞ BEKÇİ[1]
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Celal ADANUR[3]

Abstract

TİSAŞ Trabzon Weapon Industry Inc. It was established in 1993. Since its establishment, it has not stopped its development by following the rapidly developing technology. The demand for TİSAŞ products, which are international brands, is increasing day by day and quality requirements are diversifying. TİSAŞ needs to progress towards becoming a higher quality, unique and corporate company. The knowledge accumulated over the years needs to be systematized and transformed into corporate knowledge and to continue its processes institutionally without being dependent on individuals. In this paper, a study has been made on the methodology that can be a route for companies that will step into the entire institutionalization process. With the process improvement methodology, respectively; Process management was carried out by performing the senior management presentation, process determination (process map creation), process prioritization, process activities (Team building, Person Assignments), process customization (internal audits, follow-up and interim audits), creation of action plans, process management, process improvements and ensuring continuity stages.

With the process management system, all methods and tools required for automating business processes were determined. These methods and tools provided; It ensures that business processes are standardized and accelerated, and rapid changes can be made in processes in real time.

Institutionalization process; It increases efficiency by eliminating uncertainty in processes. It aims to ensure professionalization and transparency and to ensure the continuity of TİSAŞ Trabzon Silah Sanayi A.Ş. With the process methodology route, process maps are drawn, taking advantage of international standards, respectively; Internal audits, root cause analysis based on nonconformities in internal audits, preparation of the action list based on root cause analysis, prioritization based on the action list, improvement and standardization were ensured in the prioritized processes.

Keywords: Process Management, Process Methodology, Process Map, Root Cause Analysis, Action Plan

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Posters

Vegetable and Fruıt Growıng in Syrıa

Selim ALSEYİD [1]

Ahmet İPEK [2]

Abstract

Syria is a Middle Eastern country located approximately between 32° and 37° north latitude and 35° and 42° east longitude. In addition, it is located in a geography that is very beneficial to humanity in the adoption of agriculture, as it includes a part of the Mesopotamian region, where the oldest known civilizations of humanity were established. For this reason, our study is to examine the agriculture, fruit and vegetable cultivation in Syria and to evaluate the role of the agricultural sector on the Syrian economy. However, in the study, besides giving information about the agricultural structure and geographical location of Syria, detailed information is also given about its economic, human and physical geography in general. As a result, the meaning of agriculture for Syria has a much more important structure when compared to different Arab Middle Eastern countries. Syria directs almost half of its working population to agriculture instead of connecting its economy to underground resources such as oil and mines as seen in other known Arab countries. Due to the fact that its geographical structure is suitable for the cultivation of many agricultural products, different policies and practices have been put into effect in order to increase agricultural productivity. Although the civil wars in Syria have affected the agriculture sector, considering the great effects in other sectors, the benefit of agriculture to the economy is seen as an undeniable fact even during the civil war period. Syria, which has achieved great success in the export of fruits and vegetables, has regions that receive various precipitations under the influence of the Mediterranean and desert climate. While agriculture is actively practiced especially in regions where the Mediterranean climate is dominant, animal husbandry comes to the fore in regions where the desert climate is more common.

Keywords: Syria, Middle East, Agriculture, Human and Physical Geography.

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Biological Control of Tomato Early Blight Disease

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Elif YILDIRIM [2]
Berna TUNALI [3]

Abstract

Alternaria solani is the cause of early blight disease, which is seen in tomato cultivation areas all over the world and causes significant losses in production. This pathogen causes disease at every stage of plant development and affects almost every part of the plant. The most effective way to control this pathogen is the use of fungicides. However, there has been an increased development of resistance to the two main groups of fungicides, QoIs and SDHIs, due to their frequent use to control early blight. Therefore, in our study, some *Chaetomium* spp., *Trichoderma* spp. and *Fusarium oxysporum* in biological control were investigated. First of all, 12 *Alternaria* isolates collected from Samsun province and its districts were subjected to pathogenicity test. Four isolates that were determined to be pathogenic were examined in in-vitro trials in terms of their potential to be used in biological control. The highest inhibition rate in isolate number 10 of *A. solani* was achieved by *Trichoderma* isolates 37 and 39 with 79.5%. Against *A. solani*'s isolate Number 12, *Chaetomium* isolates 26, 28 and 27 showed the highest inhibition at 56.6%, 52.5% and 51.6%, respectively. By taking the two different *A. solani* isolates with the highest pathogenicity and the isolates found most effective in the dual-test, pot trials were conducted with a sensitive tomato variety for biological control potential and similar results were obtained with the results obtained from the dual test. It has been concluded that isolate of *Chaetomium* sp., *Trichoderma* sp. and *T. hamatum* has the potential to be used as a biological control agent against *A. solani* in tomatoes. It is thought that it would be appropriate to conduct further studies under field conditions and to molecularly identification study the species of *Chaetomium* and *Trichoderma* isolates.

Keywords: *Alternaria solani*, dual-test, pathogenicity, antagonist fungi

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Comparison of Time Series Models for Predicting Online Gaming Company Revenue

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Abstract

Online gaming industry is an area where the effects of any change can be seen in a very short time. Therefore, real-time analysis of revenues, analysis of the commercial performance of the developed content, and rapid monitoring of the revenue contributions of the improvements are essential. Therefore, financial forecasting is a crucial part of business plan which can help strategize how much and how quickly the company intend to grow. In financial forecasting of a given time series, revenue estimations for future will become important research in the industry. This research offers a detailed analysis of recent time series models and focused on both deep learning and statistical methods for time series forecasting on real-world revenue data. Results of the study are examined using one of the leading Finland based online gaming companies' revenue data. In our experiments, we investigated various time series forecast techniques, such as SARIMA, Theta, Holt Winters, Prophet, Dense Neural Network (DNN), Convolutional Neural Network (CNN), Long Short-Term Memory (LSTM), N-Beats and Ensemble models. The experimental evaluations illustrate that, deep learning models can optimize the financial forecast operations. The result of the study provides insights to managers and analysts in determining the best model to adopt.

Keywords: Revenue forecast; time series analysis; SARIMA; Theta; Holt Winters; Prophet; DNN; CNN; LSTM

The Investigation of *Brucella abortus* Prevalence in Pregnant Women with Miscarriage

Ipek ADA ALVER[1]

Abstract

It is known that infections during pregnancy, especially in the first trimester, cause abortion. The most important of these pathogenic bacteria is *Brucella abortus*, which is transmitted from cattle and can cause abortion in animals, as well as in humans, which was discussed until a few years ago. This pathogenic bacterium is transmitted to humans as a result of contact with the meat, milk and dairy products, feces, body fluids and abortion materials of the infected animal and causes the disease called Brucellosis and Abortion Disease. It is also known to be transmitted by contact with an infected person and breathing the same air as the environment in which the infected animal is located. In brucellosis, fever, muscle aches, weakness, headache and night sweats occur. In the later stages of the disease, agitation can be seen in addition to central nervous system inflammation, arthritis, endocarditis, liver and spleen inflammation. On the other hand, it is known that it passes to the baby through the placental route, causing infection and resulting in miscarriage. In this study, studies that were diagnosed with Standart Tube Agglutination (STA), Enzyme linked Immunosorbent Assay (ELISA) and Brucella Wright test from serological tests in pregnant women who consumed undercooked meat and meat products and raw milk and milk products or came into contact with infected animals during the first and subsequent trimesters of pregnancy will be examined. On the other hand, infection-related miscarriage rates will be investigated in pregnant women who are confirmed to have *Brucella abortus*. As a result of the study, it was suggested that infection should be considered as the cause of abortions whose cause is unknown, especially during pregnancy, and raising awareness of pregnant women about feeding raw or undercooked products.

Keywords: *Brusella abortus,* Brusellozis, pregnant, miscarriage.

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Investigation of Metal Residues that Can Transfer to Food from Some Plastic-Based Materials Used in Serving Baby and Young Children's Food

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Burcu KADIOĞLU[3]

Adnan Fatih DAĞDELEN[4]

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Abstract

The feeding of infants and young children with breast milk for the first two years is an issue that is accepted all over the world and measures are taken in this direction. Especially for the first 4 - 6 months, only breast milk is recommended because it meets all the needs of babies in the most reliable way. Baby bottles and food plates are used as service vehicles for the consumption of products such as water, milk, fruit juices, food, soup, etc. for babies and children.

The most common of the materials used in the service of baby and small children's foods are polymer (such as plastic, silicone, rubber, melamine) based. It is important for sensitive consumers such as infants and children to determine the metal residues that may migrate to food as a result of contact of polypropylene baby bottle and melamine baby food dishes with food. In the samples, Analog B (3% (w/v) acetic acid) represents the foods whose food simulants are less than pH 4.5, representing the foods determined according to their daily use purposes, and Similar A (10% (v/v) ethanol) representing the aqueous foods. Similar D1 (50% (v/v) ethanol) was chosen to represent dairy products, Similar D2 (vegetable oil) to represent fatty foods, Similar D3 (95% (v/v) ethanol), Similar D4 (Isooctane).

Structure determination analyzes of all samples to be analyzed with the study were performed. Products that are confirmed to be made of polypropylene and melamine materials declared on their labels were determined, and their food analogues were analyzed at temperatures and times in accordance with the legislation. These representative foods were scanned for 16 metal residues with an ICP-MS device, and together with 9 elements whose legal limits were determined in the legislation, they were analyzed. elements remained below the LOQ limits.

Keywords: Baby, child, structure determination, migration, metal

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Ferrocene Containing Fire Retardant Polyisocyanurate Foam

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Abstract

In this work, the combinations of phosphorous-containing fire retardants and smoke suppressant zinc borate (Firebrake ZB) and ferrocene (Fc) were used as additives to produce fire retardant and smoke suppressant rigid polyisocyanurate (PIR) foam. Fire retardants were ammonium polyphosphate (APP), triethyl phosphate (TEP), diethyl ethyl phosphonate (DEEP), and Oligomeric TEP. The polyol component/isocyanate component ratio was (100/212).

Added combustion modifiers affected the flame height and smoke density of the foam. Foam samples were examined by DIN 4102, the NBS smoke chamber, and cone calorimeter methods. Foams were formulated and produced with the same foam density and P% content. PIR foam containing only TEP (1.7% P) was taken as the reference formulation. Some foams containing combustion modifiers combinations passed the DIN 4102 standard with decreased smoke density and the lowest peak heat release rate (PHRR) values.

This was achieved by adding Ferrocene/TEP or Zinc borate/ TEP mixture into PIR formulations. While the flame height of the foam containing only TEP as a fire retardant was 130 mm, with the addition of the TEP/Zinc borate mixture, it was as low as 95 mm. In terms of smoke, Ferrocene containing formulation, smoke opacity value was 15 whereas TEP-containing foam had a value of 29. These showed that adding a low amount of Ferrocene (4%) along with TEP into PIR foam reduced considerably the generation of smoke during the fire test.

Keywords: Polyisocyanurate, flame retardant, ferrocene, smoke suppressant, trıethyl phosphate.

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Metal-organic Framework Composite-Based Materials for Hybrid Supercapacitor

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Abstract

Hybrid supercapacitors, consisting of battery-like and capacitive electrodes, are considered promising energy storage devices due to their favorable power and density. The style and manufacture of battery-like and capacitive electrodes with high specific capacitances, high performance, and desired toughness are crucial to improving the overall energy storage performance of hybrid supercapacitors. Metal-organic frameworks (MOF) with functional properties, tunable chemical structures can result in preferable energy storage efficiencies of hybrid supercapacitors. Different types of MOF calcinations have been studied in supercapacitor applications In this work, a cobalt-based 2D coordination polymer was prepared under standard solvothermal conditions using $Co(NO_3)_6$ as metal precursor, 1,4-benzenedicarboxylate(BDC) and 1-vinylimidazole (1-VIM) as organic ligants and N,N-dimethylformamide (DMF) and ethanol as solvents. 2D coordination polymer $[Co_3(BDC)_3(1\text{-}vim)_2]$ was obtained and chracterized by thermogravimetry/differential thermal analysis, Fourier transforms infrared spectroscopy, elementel analysis and powder X-ray diffraction. Cobalt-based active materials, Co_3O_4 was obtained by thermal treatments and chracterized by powder X-ray diffraction. Polyvinylidene fluoride weas used as the binder material and and conductive carbon was used to improve the conductivity in making of electrodes for supercapacitors. Electrochemical performance of $[Co_3(BDC)_3(1\text{-}vim)_2]$ and Co_3O_4 were studied by the cyclic voltammetry and electrochemical impedance spectroscopy in a three-electrode system in KOH and Na_2SO_4 electrolyte. The results are compatible with the literature values.

Keywords: Supercapacitors, Metal-organic frameworks, 1,4-benzenedicarboxylate, 1-vinylimidazole, coordination polymer

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On Visual Apprehension Ability Progressing of Mentally Defective Children In Between 6-12 Years

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Abstract

In this search, the affection of instruments and toys which are developed based to visual apprehension ability, on visual apprehension ability progressing of mentally defective children has been examined in the point of age, gender, and defect kind factors. (the visual abilities: visual differentiate, visual coupling, shape – ground connection, the place connection between the material).The results which were obtained from the phases of the participated students, have been recorded to evaluating form of visual apprehensive Ability Evaluating Tool and then evaluated.

At the end of the search, when it was examined the relation between the ages of the defective students and visual apprehension ability; it was seen that there was no meaningful difference between mentally defective students, in between 6 – 12 years; under 9 years, after 10 years categories, and visual differentiate, visual coupling, shape – ground connection, the place connection between the materialsThe relation between the genders of the defective students and visual apprehension ability has been evaluated. It was seen that there was no meaningful difference between the gender of defective students and visual differentiate, visual coupling, shape – ground connection, the place connection between the materials.

The relation between the defect type of the defective students and visual apprehension ability has been evaluated. It was seen that there was a meaningful difference at p>0.05 level between the gender of defective students and visual differentiate, visual coupling, shape – ground connection, the place connection between the materials.It has been found no meaningful relation about the completing duration of the aids and toys which are developed for progressing shape&place relation, visual matching, visual distinction and place relations among the objects when it was examined on age and gender variables. But, It has been found a meaningful relation about the completing duration of the aids and toys which are developed for progressing shape&place relation, visual matching, visual distinction and place relations among the objects when it was examined on defect type variable.

Keywords: Mentally defective,visual apprehension visual differentiate, visual coupling, shape – ground connection, the place connection between the materials.

Design of A Micro-class Electric Aircraft For the Sae Aero Design Competition

NOURAH ALSANEA

Abstract

Technology progresses fast and plays an important role in improving the quality of people`s life. Aircraft is a type of transportation vehicle that is used to move people and goods from one place to another. They are divided into three segments: fossil fuel, hybrid-electric, and all-electric. The aim of this research is to design a micro-class electric aircraft with a wingspan of 1 meter for the SAE Aero Design Student competition. This all-electric aircraft will not only have zero toxic gas emissions but will also minimize noise pollution. The main constraint that was limiting our ability to optimize this prototype was its weight and range. The lithium-ion batteries used in this aircraft have an energy density of approximately 0.9 MJ/kg, whereas jet fuel has an energy density of 43 MJ/kg. This makes jet fuel 47 times more energy dense than a battery. Calculations were made in order to obtain the aircraft dimensions. By using CAD software, a 3D structure of the aircraft was constructed. The design parameters were optimized for the aircraft to maximize its flight score (payload, range, etc.) in the competition. In general, for a given range battery capacity should be higher to achieve a lower battery weight and therefore a lower aircraft weight. Even though electric motor efficiency is higher than fossil fuel engines, the specific energy of batteries is still too low to apply to a passenger-carrying aircraft. For this reason, more research is needed to develop new technologies for batteries for future aircraft.

Keywords: Electric aircraft, micro-class, energy density