MICEE 2022
MINIA INTERNATIONAL CONFERENCE ON ENVIRONMENT AND ENGINEERING

Conference Book

Minia International Conference on Environment and Engineering

July, 14-17, 2022 Hurghada, Egypt

MICEE 2022

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Program Key

Educational Program

Plenary Sessions

The MICEE 2022 Plenary Session is made up of several presentations from respected Engineering leaders. The sessions will take place on

- **Thursday, July 14**
- **Friday, July 15**
- **Saturday, July 16**

and allows for interactive Q&A at the end of each presentation.

Technical Sessions

MICEE professionals like you participated in a rigorous peer review process and have carefully picked hundreds of papers making up MICEE's Technical Sessions. The review process highlights the most innovative solutions related to the field of engineering and environment and provides the highest quality possible. The technical program scheduled from **Friday morning through Saturday afternoon**.

Online Session

The MICEE 2022 Online Session is made up of several presentations for For participants who could not attend MICEE. The sessions will take place on **Friday, July 15**.

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Schedule-at-a-Glance

Thursday, July 14

1:30 p.m. –	Hotel Check-in	
12:30 p.m. – 3:00 p.m.	Lunch	
4:30 p.m. – 5:50 p.m.	Registration	
6:00 p.m. – 6:30 p.m.	Conference Opening **Welcome by Prof. Mohamed Ali Mourad** *Conference Executive Chair, Vice-Dean for Postgraduate Studies and Research Affairs* **Prof. Mostafa Abdelnabi Speech** *Conference Chair, President of Minia University* **Prof. Gamal El-Din Ali Abouelmagd Speech** *Previous President of Minia University, CEO & Dean of MHIET Institute* **Prof. Moustafa Mahmoud Moustafa Speech** *Conference Executive Chair, Dean of the Faculty of Engineering, Minia University*	Main Hall
6:30 p.m. – 7:00 p.m.	Plenary Session (1) **Prof. Dr. Mohamed A. Shaira** *Chairman, Engineering Studies Sector Committee*	Main Hall
7:00 p.m. – 7:15 p.m.	MICEE 2022 Memorial Photo (1)	Front of Main Hall
7:15 p.m. – 9:30 p.m.	Dinner	
9:30 p.m. – 11:00 p.m.	Free Social Gathering	Hotel Terrace

Schedule-at-a-Glance

Friday, July 15

7:00 a.m. – 9:00 a.m.	Breakfast	
9:00 a.m. – 10:30 a.m.	Technical Sessions (concurrent sessions) **TS01** Room (A) Chemical | **TS02** Room (B) Civil | **TS03** Room (C) Biomedical	All Halls
10:45 a.m. – 11:30 a.m.	Plenary Session (2)	Main Hall
	Prof. Nasser A. M. Barakat *Professor at Chemical Engineering, Faculty of Engineering, Minia University*	
11:50 a.m. – 12:30 p.m.	Aljumuaa Prayer	Main Hall
12:30 p.m. – 3:00 p.m.	Lunch	
5:00 p.m. – 6:30 p.m.	Technical Sessions (concurrent sessions) **TS04** Room (A) | **TS05** Room (B) | **TS06** Room (C) Electric | Communication | Mechanical	All Halls
6:30 p.m. – 8:00 p.m.	Online Technical Sessions (concurrent sessions with Snacks & Coffee Break)	All Halls
8:00 p.m. – 9:30 p.m.	Technical Sessions (concurrent sessions) **TS07** Room (A) Civil | **TS08** Room (B) Chemical | **TS09** Room (C) Mechanical	All Halls
10:00 p.m. – 11:30 p.m.	Conference Special Dinner	

Schedule-at-a-Glance

Saturday, July 16

7:00 a.m. – 9:00 a.m.	Breakfast	
9:00 a.m. – 10:30 a.m.	Technical Sessions (concurrent sessions)	All Halls

TS10	TS11	TS12
Room (A)	Room (B)	Room (C)
Mechanical	Architecture	Chemical

10:45 a.m. – 11:15 a.m.	Cement Company Speech	Main Hall
11:15 a.m. – 12:00 p.m.	Plenary Session (3)	Main Hall
	Professor Dr.-Ing. Khalid Abdel-Rahman *Professor, Institute for Geotechnical Engineering, University of Hannover*	
12:00 p.m. –1:00 p.m.	Conference Closing	Main Hall
1:00 p.m. – 1:15 p.m.	MICEE 2022 Memorial Photo (2)	Main Hall
1:00 p.m. – 3:00 p.m.	Lunch	
3:00 p.m. – 6:30 p.m.	Free Time	
6:30 p.m. –9:30 p.m.	Dinner	

Sunday, July 17

7:00 a.m. – 10:00 a.m.	Breakfast	
– 11:00 a.m.	Hotel Checkout	

Safe trip to home!

Plenary Session 1 (Main Hall)

Prof. Dr. Mohamed A. Shaira

Thursday, July 14

6:30 p.m. – 7:00 p.m.

Prof. Sheirah received his B.Sc. and M.Sc. in Electrical Engineering from Ain Shams University in 1966, and 1969 respectively. He obtained his Ph.D. in Electrical from University of Calgary, Canada in 1972. Prof. Sheirah is an Electrical Engineering Professor at Computer and Systems Engineering, Faculty of Engineering, Ain Shams University and the Chairman of Engineering Studies Sector Committee.

Prof. Sheirah has a great employment and activity record including the following:

- Advisor, Minister of Higher Education & Scientific Research, for Education Systems & Programs Development.
- Head, National Committee for Enhancement of Information & Communications, Systems & Technology in Higher Education Project (ICTP).
- Professor of Computer Controlled Systems, Computer and Systems Engineering Department, Faculty of Engineering, Ain Shams University, Cairo, Egypt.
- Director, Enhancement of Information & Communications, Systems & Technology in Higher Education Project (ICTP).
- Dean, Faculty of Engineering, Ain Shams University, Cairo, Egypt.
- Vice Dean, Graduate Studies and Research Activities, Faculty of Engineering, Ain Shams University, Cairo, Egypt.
- Head, Computer and Systems Engineering Department, Faculty of Engineering, Ain Shams University, Cairo, Egypt.
- Professor of Computer Controlled Systems, Electronics and Computer Engineering Department, Faculty of Engineering, Ain Shams University, Cairo, Egypt since Aug. 1983.
- Secretary General, Engineering Education Sector Committee, Higher Egyptian Universities Council.
- Head, National Committee for promotion of Professor, Computer and Systems Engineering.
- Member, Board of Directors, Behaira Electrical Power Distribution Company.
- Member, Board of Trusties, Water & Sewage Holding Company.
- Head, Faculty of Engineering Council, Ain Shams University.
- Head, Board of Directors of Engineering Consultation Center and All Units of specialized Consultation (23 Specialized Units), Faculty of Engineering, Ain Shams University.
- Head, Board of Directors, Information Systems Center, Faculty of Engineering, Ain Shams University.

Session Topic:

Current Engineering Education Challenges and Opportunities

Plenary Session 2 (Main Hall)

Prof. Nasser A. M. Barakat

Friday, July 15

10:45 a.m. – 11:30 a.m.

Prof. Nasser obtained his PhD in Chemical Engineering from Hunan University, China in 2004. From 2007 and 2009 he was a postdoctoral Research Fellow at the Bionanosyetm Engineering Department, Jeonbuk National University, Jeonju, South Korea. From 2010 to 2018, he was hired as a faculty member in Organic Materials and Fiber Engineering Department, Jeonbuk National University, Jeonju, South Korea. Currently, he is working as a professor in Chemical Engineering Department, Minia University, Egypt. From 2013 to 2018, he was hired a visiting professor in King Saud University, Riyadh, Saudi.

His research interest is focusing on applications of nanomaterials in renewable energy and water treatment fields including fuel cells, microbial fuel cells, electrolysis of urea and alcohols, green hydrogen production from water photo splitting, water treatment and water desalination. He published more than 250 papers in international journals, registered 6 patents and attend many international conferences.

In the scientific society, Dr. Barakat has a high rank as his H-index is 50 (in Scopus). He was selected among the "World Ranking of Top 2% Scientists" in 2021 introduced by experts at Stanford University, USA; Rank # 374 (out of 4637) in Energy, and Rank # 683 (out of 6089) in Material Science. According to AD

Scientific Index, in the field of chemical Engineering, Prof. Barakat' ranks are 1, 1, 2 and 359 in Minia university, Egypt, Africa and world, respectively.

Session Topic:

Nanofibers; Hot topics applications

Due to the large axial ration, nanofibers have special consideration among the nanomaterials as they possess excellent characteristics. Consequently, this class of nanomaterials shows fantastic activities in different hot applications including medical, automobiles and industries, renewable energy, water technology… etc. This lecture summarizes the history of nanofibers manufacturing and introduces some hot topics applications of the nanofibers in the form of photo session.

Plenary Session 3 (Main Hall)

Professor Dr.-Eng. Khalid Abdel-Rahman Saturday, July 16

11:15 a.m. – 12:00 p.m.

Inst. for Geotechnical Engineering, Leibniz University of Hannover, Germany

Dr. Abdel-Rahman got his Bachelor degree from Faculty of Civil Engineering - "Ain-Shams University" – Cairo – EGYPT. Afterwards he went to Germany at "University of Hannover", where he got a master degree with overall grade "Excellent" in "Geotechnique and Infrastructure Engineering". His PhD study under the excellent supervision of "Prof. Achim Hettler" at University of Dortmund - Germany was completed in a period less than three years with innovative results related to the "Numerical Investigation of Scale Effect by Earth Pressure Problems".

After getting his Ph.D., he joined the team at Institute for Geotechnical Engineering at "Leibniz University of Hannover" as Senior Lecturer then he was nominated by the head of the department "Prof. Martin Achmus" to be his "Deputy Head". During his academic career, he published with the team in his department "Institute for Geotechnical Engineering (IGtH) more than 80 publications mainly in the Numerical Modeling of Foundations Systems for Wind Energy Plants (Onshore & Offshore). Different conference publications have been awarded "Best Conference Paper Award" e.g. "K. Abdel-Rahman & M. Achmus „ Behaviour of Monopile and Suction Bucket Foundation Systems for Offshore Wind Energy Plants" in 2006.

Last but not least, winning "Outstanding Paper Award" from the international journal "**Computers and Geotechnics**" for a paper with "Prof. Martin Achmus" et al. "Behaviour of Monopile Foundations under Cyclic Lateral Loading" in 2016.

Last year, he had the honor to be one of 27 Egyptian Scientists who took part in the first Conference in Hurghada (By its Scientists, EGYPT Can..) in the time from 14 till 16 December 2016. This was a real starting point to take part actively and positively in different research projects for EGYPT.

Session Topic:

Optimized Design of Wind Energy Plants in EGYPT

Wind energy is considered as a competitive and sustainable form of renewable energy is now widely used. Large amounts of electric power coming from wind energy are produced in wind farms. A wind farm consists of a grid of wind turbines and it is installed either in land (onshore) or offshore. The wind energy plant consists mainly of four parts: the nacelle, the rotor, the tower and the foundation. The vertical force acting on the foundation is mainly dead load from the tower, the nacelle and the rotor blades. The most significant horizontal loads origins from the wind in case of onshore WEPs and from wind and waves in case of offshore WEPs. Support structures of wind energy plants are designed normally for a lifetime of about 20 years. They are exposed to high cyclic loadings and have to resist about 109 load cycles. At our Institute of Geotechnical Engineering (IGtH) at Leibniz University of Hannover (LUH), two innovative methods: **Stiffness Degradation Method (SDM) and Capacity Degradation Method (CDM)** were developed to predict the behavior of foundations systems for WEPs under cyclic loading. Dimensioning the WEPs support structure has to meet two requirements, safety and cost effectiveness. Usually this is an iterative process and requires a very efficient simulation and design package. Therefore, the optimization of the support structure is a key issue in developing cost-effective wind energy plants (WEPs). Reaching this goal all kinds of

environmental loading and their impact on the turbine's dynamics with special interest on the support structure should be considered. In our research project Gigawind *alpha ventus* at Leibniz University of Hannover (LUH), a Holistic Design Concept (HDC) was developed for WEPs support structures which use Multi-Body-System (MBS) or FE-based design methodology. Based on the previous experience from different research projects at Leibniz University of Hannover (LUH), different concepts and research aspects will be developed in order to optimize the usage of renewable energy in **EGYPT**.

Session Chairs: ***Prof. Adel Abdelmageed***
Asst. Prof. Marwa M Abdel-Ati

09:00 a.m. – 09:15 a.m.

TS01.1 Molybdenum carbide/Nickel/Carbon Composite Nanoparticles as Effective electrocatalyst for Urea Oxidation Reaction

Nasser A. M. Barakat and Marwa M Abdel-Ati*
Chemical Engineering Department, Faculty of Engineering, Minia University

Abstract

Scientists have discovered that urea pollution can cause ocean algae to develop a fatal poison known as domoic acid. Paradoxically, urea is considered a non-toxic, non-flammable hydrogen-carrying molecule with an energy density of 16.9 MJ.L-1 (approximately 10 times more than hydrogen). Moreover, compared to water, electrolysis of urea consumes lower electrical power[1]. Therefore, extraction of the embedded hydrogen from urea is a promised strategy for green hydrogen generation from abundant wastewaters[2]. Mainly, nickel-based compounds were exploited as anode materials[3]. In this study, molybdenum carbide/nickel/carbon composite nanoparticles are introduced as an effective proposed anode material for urea electro-oxidation. The suggested catalyst was prepared by the sol-gel process. Typically, the polycondensation tendency of the acetate anion was exploited for gelation molybdenum chloride, nickel acetate and poly(vinyl alcohol) aqueous solution. The formed gel was vacuously dried, grinded and sintered under vacuum atmosphere. X-ray diffraction analysis confirmed formation of molybdenum carbide/nickel/carbon composite. Moreover, scanning electron microscope was utilized to investigate the morphology. Optimization of the composite composition resulted maximizing the catalytic activity of the introduced composite. Based on the molybdenum precursor in the initial solution, different composite nanoparticles have been prepared. Typically, the observed current density at urea oxidation peak was 0.5, 4.5, 18.9, 1.7 and 2.5 mA/cm2 for composite obtained from an initial gel having 5, 10, 20, 50 and 85 wt% molybdenum carbide, respectively. Consequently, the electrode obtained from 20 wt%-sample can be considered as effective anode for hydrogen extraction from urea-containing wastewater using small bias.

Session Chairs: ***Prof. Adel Abdelmageed***
Asst. Prof. Marwa M Abdel-Ati

09:15 a.m. – 09:30 a.m.

TS01.2 Comparative Study of Size–Selected Gold Clusters (Au38) And Gold Nanoparticles Over Porous Cerium–Based Metal-Organic Frameworks with Uio–66 Architecture for Aerobic Oxidation of Cinnamyl Alcohol

*Mostafa Farrag**

Nanoclusters and Photocatalysis Laboratory, Chemistry Department, Faculty of Science, Assiut University

Abstract

The catalytic activity of the size-selected gold clusters Au38(SCH2CH2Ph)24 (abbreviated with Au38) in 3-D nanoporous Ce-metal-organic framework (Ce–UiO–66) was studied. The Au38 nanoclusters were in situ immersed in Ce–UiO–66 with a loading percentage of 1 wt.%. The Au38@Ce–UiO–66 catalyst demonstrated excellent catalytic activity for aerobic oxidation of cinnamyl alcohol. The oxidation reaction was tested from 40 –100 oC utilizing O2 gas (30 ml min-1) as an oxidizing agent in atmospheric pressure. 0.1 mol % of the Au38@Ce–UiO–66 catalyst achieved 65 % cinnamyl alcohol conversion at 100 °C within an hour with 100 % selectivity toward cinnamaldehyde in toluene. In the case of using an aqueous solvent instead of an organic solvent (toluene), the conversion was increased to 75 % under the same reaction condition. The cinnamyl alcohol conversion was increased gradually by increasing the reaction time over Au38@Ce–UiO–66 catalyst, where the conversion was enhanced to 93 % after 5 hours of heating at 100 oC in water. The catalytic activity of the Au38@Ce–UiO–66 catalyst was largely enhanced after oxygen thermal pretreatment at 100–200 oC, where the catalyst achieved 990 h-1 turnover frequency (TOF) after O2–pretreatment at 175 oC with 92 % cinnamaldehyde and 8 % cinnamic acid selectivity. The unique atomic packing structure and electronic properties of the size selected gold nanoclusters (Au38) are responsible for their extraordinary catalytic activity. Moreover, the support (Ce–UiO–66) has a big role in the catalyst activity, since it has a high ability to absorb large quantities from oxygen on the Ce(III)/Ce(IV) centers and generate active oxygen species such as superoxo and peroxo species on the catalyst surface, which help in oxidation of cinnamyl alcohol. For comparison, gold nanoparticles were loaded over the same support, where the Au(III) ions were reduced by two different reduction methods utilizing NaBH4 in absence of the ligand and hydrogen reduction at 200 oC, 4 h. The particle size of the Au38 clusters and gold nanoparticles over Ce–UiO–66 was investigated by a high resolution- transmission electron microscope (HRTEM). The charge of the gold clusters and nanoparticles was zero as confirmed by X-ray photoelectron spectroscopy (XPS). The crystallinity and surface texture properties of the prepared catalysts and the pure support were measured by powder X-ray diffraction analysis and N2 gas sorption isotherm at –196 oC, respectively.

Session Chairs: ***Prof. Adel Abdelmageed***
Asst. Prof. Marwa M Abdel-Ati

09:30 a.m. – 09:45 a.m.

TS01.3 Inverted Structure Solar Cell based on Nanofibers of Anthracene Containing PPE-PPV Copolymer: Limits and Challenges

*Shaimaa A. Mohamed**

Zewail City of Science and Technology

Abstract

There is a great demand for photovoltaics capable of harvesting solar light. In bulk heterojunction organic BHJ solar cells, a balance between the large interfacial area of both donor and acceptor constituent of the junction and domain size for charge transport with minimal recombination possibility is required. In this work, we thought of a nanofibers route to increase the interfacial area and control the active layer morphology through electrospinning technique. An Anthracene-containing Poly (p-phenylene-ethynylene)-alt-poly (p-phenylene-vinylene) (PPE–PPV) copolymer with a statistical distribution of octyloxy and 2-ethylhexyloxy side chains and accordingly donated AnE-PVstat is employed for the donor part, while phenyl C61 butyric acid methyl ester (PC61BM) is used as the acceptor part. As (AnE-PVstat: PCBM) are not directly electrospinnable, we injected it to as a core material and polycaprolactone (PCL) as a shell to form a core/shell structure. Subsequently, the PCL is washed out, and the resulted (AnE-PVstat: PCBM) fibers are carefully characterized using SEM and HR-TEM and implemented in the fabrication of BHJ solar cells.

Session Chairs: ***Prof. Adel Abdelmageed***
Asst. Prof. Marwa M Abdel-Ati

09:45 a.m. – 10:00 a.m.

TS01.4 Albumin Coated Liposome Nanoparticles as An Efficient Oleic Acid Drug Delivery System for Combating Different Cancer Cell Lines: Preparation, Characterization and Anticancer Activity Assessment

Esmail M. El-Fakarany[1], Marwa M. Abu-Serie[2], and Hamada M. El-Gendi[3]*

1. Protein Research Department, Genetic Engineering and Biotechnology Research Institute, City of scientific research and technological applications (SRTA-City), New Borg EL-Arab, 21934, Alexandria, Egypt.
2. Medical Biotechnology Department, Genetic Engineering and Biotechnology Research Institute, City of scientific research and technological applications (SRTA-City), New Borg EL-Arab, 21934, Alexandria, Egypt.
3. Bioprocess development department, Genetic engineering and biotechnology research institute, City of scientific research and technological applications (SRTA city), New Borg El-Arab, Alexandria 21934, Egypt.

Abstract

Albumin is a suitable protein to be loaded or adsorbed to liposome nanoparticles (NPs) for preparing stable protein nanocombinations with a potent anticancer activity, besides albumin can enhance the pharmacokinetic and targeting properties of the drug. Cancer diseases consider one of the most worldwide challenges, despite the development and discovery of several effective strategies and therapies for cancer treatment and diagnosis. The use of nanoparticles (NPs) for controlled drug carrier is an attractive therapeutic approach particularly for cancer treatment. NPs with size less than 200 nm are supposed to accumulate in tumor cells and increase the half-life and stability of drugs. For achieve this target, we attempted to incorporate the OA into a liposome formulation to provide its delivery to tumor cells without any cytotoxicity on surrounding normal tissues. We also attempted to coat OA encapsulated liposome with albumin which resulted in the highest synergistic antituomr effect against MDA, Caco-2 and HepG-2 cells in comparison with uncoated NPs and free OA sparing toxicity toward normal cells. The prepared albumin coated liposome NP displayed satisfactory antitumor activity against MDA, HepG-2 and Caco-2 cells with IC50 values of 46.53, 26.74 and 45.09 μM with selectivity index values (SI) determined to be 19.96, 34.73±0.52 and 20.59, respectively after 48 h of treatment. This antitumor activity of the prepared NPs was an apoptosis-dependent mechanism that was determined and confirmed through cellular morphology alterations, high percentage of annexin-stained cells and sub-G1 populations, cell cycle arrest in both sub-G1 and S phases and nuclear staining with highly fluorescent fragments. In addition, significant modifications in the expression levels of well-considered cellular apoptosis and proliferation guards (NF-κB, p53 and Bcl-2) in all treated tumor cells with formulated liposomes were emphasized as compared to OA treated cells.

Session Chairs: ***Prof. Adel Abdelmageed***
Asst. Prof. Marwa M Abdel-Ati

10:00 a.m. – 10:15 a.m.

TS01.5 Rapid Impedimetric Detection of Cadmium Ions Based on Nanocellulose/ Ligand / Nanocomposite (CNT/CO $_3$O$_4$)

*Asmaa M Fahim, Ehab E. Abu-El Magd, Rabeay Y. A. Hassan, and Hend S. Magar**
Applied Organic Chemistry Department, National Research Centre Dokki

Abstract

Ultra-trace electrochemical impedimetric assay was constructed for the direct analysis of cadmium ions in tap water samples using a new class of heterocyclic ligands/cellulose nanocomposites. A simple synthesis approach was used for producing cellulosic nanostructures that were integrated with several heterocyclic ligands (L/Nanocellulose) to be exploited as the sensor platform. For acquiring high electrocatalytic, and electrochemical activities, metal oxides /carbon nanotubes were integrated with one of the selected L/Nanocellulose to eventually form CNT/Co3O4 /L/cellulose nanocomposite. For the assay optimization, physical and chemical characteristics identified using FTIR, mass spectrometry, scanning electron microscopy, cyclic voltammetry and electrochemical impedance spectroscopy. The obtained results of each of these techniques were carefully addressed, and the impedimetric method was then optimized to reach a sub-picomolar sensitivity with no cross-reactivity with other metal ions. From the calibration curve, a wide dynamic linear range over the concentrations (10-13 M to 10-1 M), with limit of detection of 10-13 M (S/N = 3), and a very high recovery percentage in the tap water (96 to 120 %).

Session Chairs: *Prof. Sedky Abdullah Tohamy*
Prof. Faek A. Hassona

09:00 a.m. – 09:15 a.m.

TS02.1 The Behavior of Polyurethane Impregnated Sand in the Plate Load Test

*Faek A. Hassona, Mohamed M. Abdelnaeem**

Civil Eng. Dept., Faculty of Engineering, Minia University

Abstract

The soil impregnation, using an expandable polyurethane, holds unique potential for settlement compensation, lifting, and strengthening of the foundations of existing buildings and structures as well as roads subbase soil remediations. This soil strengthening technique has been actively used in recent years to reduce settlement to an acceptable tolerance. Plate load field tests have been used to assess the settlement behavior of impregnated sands in three different sites. The results of these tests were compared with those of 3D finite element models using PLAXIS 3D software. Also, samples of sand mixed with different ratios of polyurethane (0.5, 1.0, 2.0, and 4.0% by weight) were tested and modeled by PLAXIS 3D. The results indicated a substantial increase in strength and a reduction in settlement for impregnated or Lab. mixed samples. Upon unloading, the impregnated samples behaved like perfectly elastic material.

Session Chairs: *Prof. Sedky Abdullah Tohamy*
Prof. Faek A. Hassona

09:15 a.m. – 09:30 a.m.

TS02.2 The Effect of Lateral Confinement on the Ultimate Bearing Capacity of Shallow Foundations on Sand

*Emad A. M. Osman, Ahmed Abd El-shakour**

Faculty of Engineering, Minia University, Egypt

Abstract

The main objective of the present research is to study the effect of using confining system to improve the bearing capacity of the supporting soil. The effects of increasing subgrade stiffness using confining walls on the foundation subgrade and the structure stability are investigated. This practice is investigated numerically using three-dimensional finite element analysis (Plaxis3D). A square foundation subjected to uniform applied stress is idealized with and without confining walls. Based on the results of the numerical analysis, charts are presented to estimate the enhanced bearing capacity of square foundations resting on extended sand, sand relative density, rigid confining walls depth, maximum deformation of the foundation. Moreover, it was observed, for the study variables considered that the bearing capacity can be improved to 3.8 times by laterally confining the soil subgrade.

Session Chairs: *Prof. Sedky Abdullah Tohamy*
Prof. Faek A. Hassona

09:30 a.m. – 09:45 a.m.

TS02.3 RC Structures have Transfer Beams Subjected to Vertical and Horizontal Loads

*L. M. Abdel-Hafez[1], Yasser R. Tawfic[1], M. S. Saleh[2]**

1. Civil Engineering department, Faculty of Engineering, Minia University
2. Civil engineering department, Faculty of Engineering, Nahda University

Abstract

Buildings are designed to meet their architectural and functional needs that may lead to structural complexity. The construction of a reinforced concrete column from the ground floor may cause an architectural problem that could be solved using transfer reinforced concrete beams. Serving as a support for a column, the transfer beams are subjected to a high value of loads and stresses. This research is a theoretical study using Autodesk Robot Program to investigate the overall behavior of a multi-story reinforced concrete buildings have transfer RC beams. The studied variables are the stiffness of the transfer beams, the type of the loads, and the type of the supports of the transfer beams. The theoretical investigation showed that the values of deflection of the transfer beams may affect the straining actions and the stresses of the remaining reinforced concrete elements of the multi-story buildings. Special attention and restrict recommendation should be taken into account for the design of the transfer beams.

Session Chairs: *Prof. Sedky Abdullah Tohamy*
Prof. Faek A. Hassona

09:45 a.m. – 10:00 a.m.

TS02.4 Estimating the Concrete Behavior Using Artificial Intelligence: Proof of concept

*Alaa Eldin Y. Abouelezz[1], Ashraf Amin[2]**

1. Assoc.Prof., Civil Engineering Dep., Faculty of Engineering, Minia University, Minia, Egypt,
2. Teaching Assistant, Civil Engineering Dep. Faculty of Engineering, Minia University, Minia, Egypt.

Abstract

Most structure members used nowadays and in the future contain concrete, so it is crucial to raise the accuracy of forecasting the concrete strength all time to make the best use of it. Concrete is a non-homogeneous material that consists of various materials, each one has its unique physical properties. Based on the contribution percentage for each component of the concrete mixture, we get a different concrete compressive strength for the produced concrete.

Session Chairs: *Prof. Sedky Abdullah Tohamy*
Prof. Faek A. Hassona

10:00 a.m. – 10:15 a.m.

TS02.5 Numerical Investigation on The Hot Spot Stress at Fatigue-Prone Details of UHPC Reinforced Orthotropic Steel Decks

Hesham Abdelbaset[1], and Bin Cheng[2]*

1. Department of Civil Engineering, Faculty of Engineering, Minia University, Minia 61111, Egypt.
2. State Key Laboratory of Ocean Engineering, Shanghai Key Laboratory for Digital Maintenance of Buildings and Infrastructure, Department of Civil Engineering, Shanghai Jiao Tong University, Shanghai 200240, China.

Abstract

Orthotropic steel decks (OSDs) have been widely used in long and medium-span steel bridges because of superior structural features such as lightweight, high load carrying capacity, and modular construction. However, OSD is reported as one of the most structures experiencing fatigue defects which could limit the service life of the bridge deck. Recently, Ultra-High-Performance Concrete (UHPC) has been employed as a top layer in OSDs to improve the whole stiffness of OSDs and enhance their fatigue resistance. In the current study, numerical investigation has been performed to explore the stress response at fatigue-prone details of OSDs under the effect of repeated vehicle loading. In addition, the effect of employing UHPC layer on the hot spot stress at sensitive fatigue locations has been investigated. Quadratic extrapolation approach has been adopted to estimate the hot spot stress at the weld toe of the considered welded details. Results indicated that the stresses at rib-to-floorbeam welded connection are the highest stresses among the considered fatigue-prone locations and thus more concerns should be paid for the enhancement of its fatigue resistance. The application of a 50 mm thick UHPC layer considerably minimized the hot spot stresses at critical locations of all the considered fatigue-prone details in OSDs which indicates the efficiency of employing UHPC layer in OSDs for improving their fatigue strength and providing an infinite fatigue life.

Session Chairs: *Prof. Sedky Abdullah Tohamy*
Prof. Faek A. Hassona

10:15 a.m. – 10:30 a.m.

TS02.6 Performance of Cold-Formed Steel Channel Beams with Web Openings Under Pure Bending

*Sedky Abdullah Tohamy[1], Khalid Farah[2], M.A. Saifeldeen[2], M. Abdelazeem Hassan[2]**

1. Department of civil Engineering, Minia University, Egypt
2. Department of civil engineering, Aswan University, Egypt

Abstract

The aim of this paper is to investigate numerically the flexural behavior of cold-formed channel beams with web openings. A nonlinear finite element model (FEM) for cold-formed channel beam was verified against experimental test and showed a good agreement with experimental results in term of ultimate load capacity, load-deflection curves and failure mode results. Based on the verified model several configurations of web openings were analyzed. The numerical results clarified that, there is no significant effects in the load capacity of beams when the hole diameter-to-web depth ratio (dh/hw) is up to 0.5. However, the load capacity is obviously decreased when (dh/hw) further increases up to 0.8. Lastly, a parametric study was carried out to emphasize which size of openings gives best performance during loading.

Session Chairs: *Assoc. Prof. Mohamed Ahmed Massoud*
Assoc. Prof. Mohamed N. Saad

09:00 a.m. – 09:15 a.m.

TS03.1 The association of MIR146A, MIR499/MIR499A, MTMR3, MIR155HG, IRAK1, and PADI4 with Rheumatoid Arthritis in the Egyptian population

Mohamed N. Saad[1], Alaa M. Ibrahim[2], Nada M. Hassan[2], Mai S. Mabrouk[3], and Olfat G. Shaker[4]*

1. Biomedical Engineering Department, Faculty of Engineering, Minia University, Minia, Egypt.
2. College of Computing and Information Technology, Arab Academy for Science, Technology and Maritime Transport, Cairo, Egypt.
3. Biomedical Engineering Department, Faculty of Engineering, Misr University for Science and Technology (MUST), 6th of October City, Egypt.
4. Medical Biochemistry and Molecular Biology Department, Faculty of Medicine, Cairo University, Giza, Egypt.

Abstract

This study aims to perform an association study between six single nucleotide polymorphisms (SNPs) and rheumatoid arthritis (RA) disease in Egyptian population with 52 patients and 49 healthy individuals. The SNPs that are included in this study are rs2910164 (C/G), rs3746444 (T/C), rs12537(C/T), rs767649 (A/T), rs3027898 (A/C) and rs1748033 (C/T). The used models to test the associations are multiplicative, recessive, dominant and co-dominant. The results showed that rs2910164 and rs12537 were associated with RA, while rs3746444 showed no association in all tested models. The remaining SNPs were excluded as they didn't pass the Hardy-Weinberg Equilibrium (HWE) test.

Session Chairs: *Assoc. Prof. Mohamed Ahmed Massoud*
Assoc. Prof. Mohamed N. Saad

09:15 a.m. – 09:30 a.m.

TS03.2 Lactoferrin Coated 5-Fluorouracil Loaded Chitosan-Dextran Sulfate Nanoparticles: Preparation, Characterization and Its Anticancer Activity Assessment

Hala M. El-Arousy[1,2], and Esmail M. El-Fakharany[1]*

1. Protein Research Department, Genetic Engineering and Biotechnology Research Institute, City of Scientific Research and Technological Applications (SRTA-City), New Borg EL-Arab 21934, Alexandria, Egypt.
2. New Borg EL-Arab Hospital, Alexandria, Egypt.

Abstract

Lactoferrin (LF) is iron binding glycoprotein and is known to be possess many biological functions. So LF consider attractive protein to be coated 5-fluorouracil (5-FU) loaded chitosan nanoparticles (CS-NPs) to overcome the pharmacokinetics, gastrointestinal reactions and non-selectivity associated with 5-FU in cancer treatment. In the present study, CS-NPs were prepared, loaded with 5-FU and then coated with LF or still uncoated to form both LF coated 5-FU loaded NPs and 5-FU loaded NPs, respectively. LF coated NPs and uncoated NPs are polydispersed, regular, stable, and have zeta potential 5+mV and 47+mV, respectively. LF coated NPs were more toxic to cancer cells without affecting the normal cells in comparison to 5-FU loaded NPs and free 5-FU. The prepared NPs increase the uptake of 5-FU in HepG-2, MCF-7, caco-2 and NFS-60 cells and initiated apoptosis process by extremely changes in cellular morphology and sub-G1 populations as well as nuclear staining with brilliant orange fluorescence. Moreover, these NPs enhanced the significant changes in the expression of NF-κB, Bcl-2 and p53, cellular apoptosis guards, tumor suppressor genes in treated cancer cells compared to 5-FU treated cells. Thus, new data revealed that LF coated 5-FU loaded NPs are safe selective anticancer drug caused tumor cells death by inducing apoptosis followed by DNA damage.

Session Chairs: *Assoc. Prof. Mohamed Ahmed Massoud*
Assoc. Prof. Mohamed N. Saad

09:30 a.m. – 09:45 a.m.

TS03.3 Oxygen Purity Analysis for COVID-19 Isolation Facilities

*Enas Ismail**

Department of Biomedical Engineering, Faculty of Engineering, Minia University, Minia, Egypt.
Technical manager of unit of medical equipment calibration and consultation (UMECC), Faculty of Engineering, Minia University, Minia, Egypt.

Abstract

Nowadays, medical oxygen is highly demanded for treating silent hypoxia caused by Covid-19. Most of Covid-19 isolation facilities, specially at developing countries, are mainly based on compressed-gas (CG) cylinders for delivering medical oxygen. Higher production and refilling rate of oxygen CG cylinders may increase the oxygen impurity leading to hidden mortality at Covid-19s' late infection levels. Thus, the purity of oxygen should be accurately tested before supplying it to the patients. In fact, accuracy of the medical oxygen is mostly evaluated by the cylinder's pressure measured at its outlet nozzle specially at developing countries where there is a lack of scientific assessment. The aim of this paper is to present a simple oxygen purity analysis based on the international medical oxygen standardization. An experimental study was performed to test oxygen purity by using a calibrated 'electrochemical galvanic fuel cell type' oxygen analyzer. The purity readings of 109 CG oxygen cylinders randomly selected from a COVID-19 isolated facility were compared to the standard oxygen purity rate required for medical purpose. 30% of the tested oxygen CG cylinders do not satisfy the required medical oxygen purity standardization. This result emphasizes the importance of following the standardizations for medical oxygen acquization. Thus this paper concludes with providing guidelines required for Covid-19 isolated facilities to create awareness and recommendations to improve the acquization of medical oxygen specially from compressed-gas cylinders.

Session Chairs: *Assoc. Prof. Mohamed Ahmed Massoud*
Assoc. Prof. Mohamed N. Saad

09:45 a.m. – 10:00 a.m.

TS03.4 Self-Organizing Fuzzy Logic Controller of Adaptive Artificial Ventilation system for COVID-19 patients in Intensive Care Units

*El-Sayed M. Ahmed **

Computer and Systems Department, Minia University

Abstract

Properly operating Artificial Ventilation Systems are very powerful and effective life-saving tools for millions of COVID-19 patients. On the other hand, they become very harmful devices to the ventilated patients if not properly controlled.
Although, various methodologies of automation were brought to the proof in the field of artificial ventilation systems, all still depend on clinician knowledge and skills. It is well known that, a clinician who is good at clinical medicine is not automatically qualified to perform artificial ventilation. This paper presents a novel selforganizing fuzzy multi-steps controller for artificial ventilation systems. The main advantage of the proposed controller is that, it does not rely on clinician expertise or need an extensive training
for the operating staff. This eliminates the possible serious consequences due to human error. Also, it can safely ventilate neonatal, pediatric, and adult patients while, maintaining patientventilator.

synchrony and patient comfort. The approach used to develop this Self Organizing Controller involves designing an intelligent adjustment mechanism to modify the control rule base for a Fuzzy Logic controller as a result of observed patient and
ventilator performance. The controller finds by itself the right amount of respiratory rate and inspiratory pressure for every generated artificial breath. Also, the proposed controller can be configured to handle multiple patients simultaneously to meet
COVID-19 Disaster Surge. The effectiveness of the proposed controller has been investigated by means of computer simulation. Feasibility and robustness of the system is assured. A clinical trial of this controller will be taking place in Minia University Hospital.

Session Chairs: *Assoc. Prof. Mohamed Ahmed Massoud*
Assoc. Prof. Mohamed N. Saad

10:00 a.m. – 10:15 a.m.

TS03.5 Implementation of Surgical Robotic Arm

*Mohamed Ahmed Massoud**

Associated Professor, Minia university

Abstract

The objective of this paper is the implement a novel flexible robotic surgical system with high accuracy. It presents the implementation of a surgical 6 degrees-of-freedom (DoF) robotic arm with camera-guided navigation. A kinematics analysis was conducted to optimize the workspace. Forward and Inverse kinematics were achieved. The forward kinematic analysis was created to achieve the configuration which contained joints and links to get the D–H parameters. It described the position of the end effector referred to as the base frame. The Inverse kinematics was calculated to get the joint angles position of the end effector at a certain point in the space by using Newton–Raphson method. The relationship between the joint actuator torques and motion was achieved by using the Lagrange–Euler (L–E) formula. Moreover, the trajectory was calculated. The trajectory of robotic surgery was tested with 100% accuracy.

Session Chairs: *Assoc. Prof. Mohamed Ahmed Massoud*
Assoc. Prof. Mohamed N. Saad

10:15 a.m. – 10:30 a.m.

TS03.6 COVID-19 Detection using Transfer Learning Approach through Chest X-Ray Images

A. A. Donkol[1], Doaa M. nada[2], Hesham F. A. Hamed[2], and Mahmoud A. Abdelghany[3]*

1. Faculty of Engineering, Nahda University in Benisuif (NUB), Egypt
2. Faculty of Engineering, Minia University, Minia, Egypt
3. Faculty of Engineering, Egyptian-Russian University, Cairo, Egypt.

Abstract

The outbreak of the novel coronavirus brought the world to a halt, affecting the health care system all over the world. Thus, the need for a rapid and accurate detection method emerged to help stop the high death rates. The use of Convolution Neural Networks (CNN) with chest X-ray screening has been demonstrated to be effective in early COVID-19 diagnosis. Therefore, four distinct transfer learning models are investigated in this study, including VGG16, VGG19, ResNEt101, and ResNet50, to detect COVID-19 in two-class (case 1) and three-class (case 2) classifications. In both cases, the classifications are carried out on a balanced dataset. In case 1, a binary classification between COVID-19 patients and non-infected X-rays is performed, while in case 2, a multi-classification between COVID-19, viral pneumonia patients, and non-infected X-rays is presented. The models' performance is evaluated by the confusion matrices obtained from each model. The test results are presented in terms of accuracy, precision, recall, and F1-Score. The results demonstrate that the VGG16 model has the highest accuracy in both scenarios compared to other models, with a binary classification accuracy of up to 99% and a multi-classification accuracy of up to 94%.

Session Chairs: ***Prof. Abou-Hashema M. Elsayed***
Prof. Gamal M. Dousoky

05:00 p.m. – 05:15 p.m.

TS04.1 Improved Model of a Gallium Nitride HEMT for High Power Application

Gamal M. Dousoky[1], Fatma Ali[1], Mahmoud Abdelghany[1], Mohamed Abouelatta[2], Masahito Shoyama[3]*

1. Department of Electrical Engineering, Faculty of Engineering, Minia University, Egypt,
2. Department of Electronics and Communications Engineering, Faculty of Engineering, Ain Shams University, Egypt,
3. Department of Electrical Engineering, Faculty of Information Science and Electrical Engineering,Kyushu University, Japan

Abstract

In this paper, a development of GaN-HEMT model has been presented. Static characteristics are extracted from a commercial device datasheet and fitted into an empirical model using MATLAB software package. The stability performance of GaN devices is important to work in most of applications. The equivalent circuit model is tested in a simple configuration for plotting I-V curve through estimating parameters of the gate-drain capacitance (CGD) and drain-source capacitance (CDS). These parasitic capacitances are essential to provide a discernment into the behavior of switching performance of the device as well as critical parameters to enhance behavior of model static current-voltage characteristics. A stable performance of I-V curve has been achieved after using the proposed improved model equations of those capacitances. The obtained results show that the proposed model of GaN-HEMT is favorable for high temperature and high power density power conversion applications.

Session Chairs: *Prof. Abou-Hashema M. Elsayed*
Prof. Gamal M. Dousoky

05:15 p.m. – 05:30 p.m.

TS04.2 Enhancing the Dynamic Performance of a Standalone DFIG Under Variable Speed Operation Using an Effective Control Technique

Mahmoud K. Abdelhamid, Mahmoud A. Mossa, and Ahmed A. Hassan*

Electrical Engineering Department, Faculty of Engineering, Minia University

Abstract

The paper aims at introducing an efficient control algorithm which enhances the dynamic performance of a standalone doubly fed induction generator (DFIG) operating at variable speeds. To illustrate the effectiveness of the proposed controller, the performance of the DFIG is also evaluated using other control strategies. The control approaches which are used for the comparison purpose are the stator voltage-oriented control (SVOC) and the model predictive direct torque control (MPDTC). At first, the performance of the DFIG under each control technique is analyzed in details, showing the principle of operation of each strategy; then, a comprehensive dynamic performance comparison is performed among the three controllers; through which the merits and defects of each technique are clarified. The results confirm the validation and superiority of the proposed control strategy over the other control techniques. This is illustrated through the faster dynamics, the simplicity, the reduced computational efforts and reduced ripples content.

Session Chairs: *Prof. Abou-Hashema M. Elsayed*
Prof. Gamal M. Dousoky

05:30 p.m. – 05:45 p.m.

TS04.3 Dynamic Performance Analysis of An Electric Vehicle System Using Different Control Algorithms

Mohamed R. M. Hassan, Mahmoud A. Mossa and Gamal M. Dousoky*

Electrical Engineering Department, Faculty of Engineering, Minia University

Abstract

This study introduces a comprehensive dynamic performance analysis of an electric vehicle (EV) system using different control techniques. The entire system components are initially modeled in details. The electric vehicle system is then tested using field-oriented control (FOC) and finite control set predictive current control (FCS-PCC) techniques. The implementation of the FOC is based on hysteresis current controller (HCC) which forces the input current of the induction motor (IM) to follow the reference current. Meanwhile, the operation of predictive current control scheme articulates on a designed cost function which guarantees the minimum error between the predicted and reference currents. The EV system dynamic performance is tested by simulation using MATLAB/Simulink software. The obtained results illustrated that the electrical and mechanical dynamics of the vehicle under PCC technique exhibits better performance compared to the results obtained using the FOC based hysteresis current controller. This is illustrated through the fast dynamic response, low torque and flux ripples and low current harmonics.

Session Chairs: ***Prof. Abou-Hashema M. Elsayed***
Prof. Gamal M. Dousoky

05:45 p.m. – 06:00 p.m.

TS04.4 DEEP Learning Classification Algorithms Survey and Review

Ibrahim Mohamed Imam[1], Kamel Hussein Rahouma[2]*

1. Head of payload test lab in AITC, Egyptian Space Agency
2. Faculty of Engineering, Minia University, Minia, Egypt. Currently: Vice Dean of the Faculty of Computer Science, Nahda University in Beni Suef, Egypt

Abstract

Image processing is considered as key in remote sensing fields. It is very wide and it has many branches. One of the major helpful widely used techniques in image processing, is image classification. Image classification is used to classify the extracted features from the digital images into different classes based on different characteristics. Machine learning and deep learning are two main techniques to automate the processes of image processing and classification. This paper introduces a survey on the recently used classification techniques using deep learning.

Session Chairs: *Prof. Abou-Hashema M. Elsayed*
Prof. Gamal M. Dousoky

06:00 p.m. – 06:15 p.m.

TS04.5 Design and Implementation of a Trigger Digitizer for Earthquake Monitoring System

Emad B. Helal, Omar M. Saad, Ali G. Hafez , Gamal M. Dousoky*

NRIAG, and Minia University

Abstract

One of the main devices in the earthquake monitoring system is the digitizer, which converts the analog signal to a digital one. We design and implement a trigger digitizer to store/transmit the seismic data. The implemented digitizer consists of several blocks, i.e., the power source, the front end circuit, analog to digital converter (ADC), GPS receiver, microcontrollers, microprocessor, and deep learning picking module. Besides, we use three finite impulse response (FIR) filters to decimate the sampling rate of the input seismic data. In addition, we utilize the CapsPhase network to pick the first arrival time of the earthquake. In this way, the digitizer is a trigger device, where an enable signal is released once the earthquake is detected to take the appropriate action.

Session Chairs: ***Prof. Abou-Hashema M. Elsayed***
Prof. Gamal M. Dousoky

06:15 p.m. – 06:30 p.m.

TS04.6 Optimal Sizing and Economic Evaluation of Hybrid Photovoltaic/Wind/Battery/Diesel Generation Systems for Autonomous Utilization

Ahmed Yamany, Mohamed A. Mohamed, Yehia S. Mohammed*

Electrical Engineering Department, Faculty of Engineering, Minia University

Abstract

In this paper, an innovative method is introduced to calculate the optimum size of an autonomous hybrid system to determine the lowest levelized energy cost (LEC) and dummy energy (Edummy) generated from the system with the highest reliability index utilizing an Iterative Optimization Technique (IOT). The system includes photovoltaic (PV) panels, wind turbine generators (WTG), diesel generator (DG) and battery storage. An innovative computer program (CP) has been developed based on real time meteorological data of solar radiation, wind speed, ambient temperature and the load demand of one year in 8,760 hours. An accurate methodology for an autonomous site located in the New Valley Governorate of Egypt and many WTG from different manufacturers for obtaining the maximum energy production at the minimum cost of energy provided by the system has been introduced. The CP modifies the penetration ratio of wind and PV in certain increments to meet the demand load. An economic methodology has been performed to obtain the minimum energy cost. A validation of the CP is carried out by comparing the acquired results with those obtained from the HOMER software and Grey Wolf Optimizer (GWO). Results showed the effectiveness of IOT in determining the optimal size of system.

Session Chairs: *Prof. Khaled R. M. Mahmoud*
Prof. S. A. El-Agouz

05:00 p.m. – 05:15 p.m.

TS05.1 Evaluation of Performance and Emission Characteristics for Diesel Engine Operated with Used Cooking Oil Biodiesel/Butanol Blends

*M. Mourad **

Mechanical Engineering Department, Faculty of Engineering, Minia University, Minia, Egypt

Abstract

Recently, the world is interested in finding alternatives to traditional fossil fuels such as diesel or gasoline to power internal combustion engines. This deep seek of the world is due to important reasons, including the scarcity and near expiration of petroleum fuel stocks, as well as the pollution resulting from fossil fuels when used in internal combustion engines and vehicles.

Therefore, this research paper is concerned with how to produce biodiesel fuel as one of the alternative solutions to fossil fuels and therefore it can be used as a fuel for diesel engines. Therefore, there is a wide interest of researchers in the production of biodiesel in many ways from different vegetable oils (food and industrial) as well as from animal fats. There are other directions for producing biodiesel from cooking oils used in homes and factories. This work is concerned with evaluating the performance and pollution of a diesel engine 14 hp and 1500 rpm, when using biodiesel fuel produced from used cooking oils in homes. This investigation study is concerned with conducting a practical study of the diesel engine to determine the best engine performance when operates with a blend fuel of biodiesel and butanol. It included engine performance parameters such as torque, thermal efficiency, specific fuel consumption, and pollutants emitted from the engine were also measured, such as CO, CO2, HC and NOx at engine load 50 %. The results show that this type of biodiesel/butanol blends contributes to reducing the pollutants emitted from the engine, especially CO and HC. While there is a somewhat increase in the emission of CO2 and NOx, the engine performance are also improved, while the value of the output engine power at medium load conditions is negatively affected.

Session Chairs: *Prof. Khaled R. M. Mahmoud*
Prof. S. A. El-Agouz

05:15 p.m. – 05:30 p.m.

TS05.2 Experimental Investigation of the Performance and Exhaust Emissions of a Spark-Ignition Engine Operating with Different Proportional of Methanol- Gasoline- Water Ammonia Solutions Blends

Muhammad Ezzat, Sherif Fathy Abd El Fattah, M. Mourad, and Ismail M. Youssef*

Automotive and Tractors Engineering department, Faculty of Engineering, Minia University

Abstract

This study investigates the practicality of using methanol-gasoline-water ammonia solution fuel mixture in a spark ignition (SI) engine and its effect on the engine's performance and emissions and compares the findings to those acquired utilizing base gasoline. A single-cylinder, four-stroke, air-cooled SI engine coupled with an AC generator was used in this study. Methanol and water ammonia solution (WAS) fuel was blended with pure gasoline in volume rates of 30% of methanol and different percentages of water ammonia solution ranging from 5 to 10% by volume. The experimental investigation is conducted at an off-road engine under a constant engine speed of 3000 rpm and various engine loading. The experimental outcomes indicated that using methanol as an addition to ammonia hydroxide and gasoline fuel is essential to improve engine performance and reduce the engine's pollutants during different operating conditions. The blend consists of 60% gasoline, 30% methanol, and 10% WAS (G60M30WAS10) by volume mitigated CO and HC emissions by 8.29% and 8.23%, respectively, at maximum loading conditions compared to pure gasoline. Nonetheless, the Concentration of CO2 and NOx emissions in the released flue gases was observed to increase with the augmentation of water ammonia solution percentage in the fuel blend.

Session Chairs: *Prof. Khaled R. M. Mahmoud*
Prof. S. A. El-Agouz

05:30 p.m. – 05:45 p.m.

TS05.3 Mathematical Modeling and Performance Evaluation of Solar Thermal Membrane Desalination System for Efficient Freshwater Production

S. A. El-Agouz, Mohamed E. Zayed, Ali M. Abo Ghazala, Ayman Refat Abd Elbar, Mohammad Shahin, M. Y. Zakaria, and Khaled Khodary Ismaeil*

Department of Mechanical Power Engineering, Faculty of Engineering, Tanta University, Tanta Faculty of Industry and Energy Technology, Delta Technological University, Quesna, Egypt Military Technical College, El-Qobba Bridge, El Weili, Cairo, Egypt.

Abstract

Membrane distillation (MD) is a promising technique that possesses the advantages of both membrane separation and thermal distillation processes. The required energy for heating the feed fluid considers the greatest portion of energy consumption in MD. The conjugation MD with solar energy sources can be utilized as a hybrid desalination technology for efficient desalination in remote regions. In this study, a detailed theoretical model implemented in the MATLAB software based on heat transfer and thermodynamic analyses is developed to dynamically simulate a solar direct contact membrane distillation system (SDCMDS) powered by a vacuumed tube solar collectors (VTSCs) to analyze its performance, under real weather conditions of Tanta, Egypt (30.47° N and 31° E). The effects of the solar collecting area (number of the utilized solar collectors) on the performance of the proposed SDCMDS for improving the feed inlet temperature of the saline water and augmenting the freshwater productivity of the system are studied as well. Four cases of the proposed SDCMDS are investigated: two identical VTSCs of 1.80 m2 each unit in summer (Case I), two identical VTSCs in winter (Case II), four identical VTSCs in summer (Case III), and four identical VTSCs in winter (Case IV). The simulation results show that the utilization of four VTSCs connected in series significantly improved the feed seawater temperature range from 30.0 to 70.0 °C compared to a feed temperature range of 30.0−49.5 was achievable by utilizing only two VTSCs. Moreover, the daily freshwater production was 7.60, 4.64, 23.37, and 14.95 L/day with permeate flux were 2.11, 1.29, 3.25, and 2.08 L/day per m2 of solar collecting area for Cases I, II, III, and IV, respectively, at a feed flow rate of 0.20 kg/s. The daily averaged overall efficiency of the system was obtained to be 14.70%, 12.50%, 24.95%, and 22.50% for Cases I, II, III, and IV, respectively. Conclusively, it can be inferred that Case III was the best design configuration from both freshwater production and energy consumption saving considerations.

Session Chairs: *Prof. Khaled R. M. Mahmoud*
Prof. S. A. El-Agouz

05:45 p.m. – 06:00 p.m.

TS05.4 Role of Nanolubricants in Improving Vehicle Engines Performance

*Mohamed Kamal Ahmed Ali**

Automotive and Tractors Engineering Department, Faculty of Engineering, Minia University, Minia 61519, Egypt

Abstract

Nowadays and future, energy resources are of strategic interest in Egypt. The transportation sector is a principal consumer of different energy resources. Therefore, reducing the consumption of vital energy resources is critical especially in automobiles with increasing concern about energy shortage and environmental protection. Accordingly, Egypt needs novel affordable strategies, accessible and sustainable for fuel economy and reducing the exhaust emissions from engine vehicles. In automobiles engines, the friction is a principal cause of energy dissipation owing to the frictional losses from engine power produced. Hence, the key motivation of this project is to improve the tribological behavior and performance of automotive engines as a promising and straightforward approach in saving energy and reducing emissions using advanced nano-lubricants (nanomaterials and ionic liquids eco-friendly into the synthetic base oils and bio-lubricants) to replace the use of environmentally harmful additives in traditional engine oils. This project also offers the economic feasibility of consumed lube oils recycling using nano-additives. Furthermore, this project aims to reveal the new mechanisms responsible for solving the sedimentation problem of the nanomaterials in lube oils regarding longer-term stability. By linking tribological results using various test benches with actual engine performance and exhaust emissions for various nano-additives and lube oils, we can explore novel nanolubricants mechanisms (physical, thermal and chemical) responsible for anti-friction, anti-wear, self-healing for the frictional surfaces, energy saving, increase engine durability and reducing emissions. Besides, this project provides a new theoretical basis in nanoscale for creating software programs that allow car driver to know the oil efficiency to suppress the operating costs. Eventually, based on our previously published results, nano-lubricants has the potential to reduce fuel consumption in automobiles as much as 20% leading to a considerable decrease in the total annual fueling cost over the whole country, which translates into the provision of billions to Egypt.

Session Chairs: *Prof. Khaled R. M. Mahmoud*
Prof. S. A. El-Agouz

06:00 p.m. – 06:15 p.m.

TS05.5 A new approach for finding initial basic feasible solution of a transportation problem

Mohamed H. Abdelati *

assist lecturer - faculty of engineering Minia university

Abstract

In this paper, a new approach is proposed to find an initial basic feasible solution (IBFS) for transportation problem (TP). Finding IBFS simply and effectively at the same time makes it easy to achieve the T.P optimal solution. The proposed method aims to find a near-optimal solution in easy steps by "Avoiding the Big Cells" (ABC), which have larger unit cost values to reduce the total transportation cost. The solution algorithm of the new method is included.

Session Chairs: *Prof. Khaled R. M. Mahmoud*
Prof. S. A. El-Agouz

06:15 p.m. – 06:30 p.m.

TS05.6 Combustion Characteristics of Assisted Air Pressure Swirl Atomizer

H. M. Gad, E. A. Baraya, T. M. Farag, and I. A. Ibrahim*

Department of Mechanical Power Engineering, Faculty of Engineering, Port Said University, Port-Said, Egypt

Abstract

The present study is focused on studying the combustion characteristics of the modified pressure-swirl atomizers (PSA) to operate as air assist pressure swirl atomizer (AAPSA) under different operating conditions and different sizes of the atomizer swirl passage (width x depth). The operating condition studied are air to fuel mass ratio which changed as 28, 37, 52 and 65, assist air mass flow rate which varied as 2, 4, 5 and 7.5 g/s, the input thermal load which changed as 28, 44, 60, and 80 kW. The atomizer swirl passages sizes are varied as 1x1, 1.5x1.5, 2x2 and 2.5x2.5 mm2. Combustion test rig is designed and manufactured to investigate the effects of the above parameters on the combustion characteristics. The temperatures maps, dimensionless visible flame length and combustion species concentrations along the combustor are measured and presented using commercial diesel oil as fuel. The results indicate that, by increasing the swirl passage size, the high temperatures region size increased, the visible flame length increased, CO and O2 concentrations increased, while NO and CO2 concentrations decreased. The axial NO concentrations trend is matched with the axial flame temperature profile. The flame length increased by increasing assist air mass flow rate, thermal load, swirl passage size and by decreasing the air to fuel ratio.

Session Chairs: *Assoc. Prof. Ahmed A. Ibrahim*
Assoc. Prof. M. I. Ahmed

05:00 p.m. – 05:15 p.m.

TS06.1 Linear to Circular Polarization Conversion Using Selective Surfaces for Terahertz Applications

A.M. Mabrouk, Ahmed A. Ibrahim, and Hesham F.A. Hamed*

Minia university

Abstract

This paper suggests single and dual-band polarization converter structures based on frequency selective surfaces (FSS). These surfaces are called polarization-selective surfaces (PSSs). The single-band PSS is a periodic structure of FSS-based unit-cell elements. The structure of the unit-cell element consists of two concentric hexagonal-shaped rings placed over a silicon substrate. The single-band PSS can convert the polarization of the incident wave from linear to circular over a wide 3dB-axial ratio band ranging from 0.53 to 0.68 THz (20 % 3dB-AR BW). Thus, it successfully converted the LP wave of a CPW-fed antenna into a CP wave with 3dB-AR of 54.4 % BW. Moreover, it enhanced its gain from 2.13dBi to 6.54 dBi. As well as, a dual-band FSS-based unit-cell element is designed which can be used for dual band antennas. The first band has 3dB-AR extended from 0.53 THz to 0.62 THz (0.16% 3dB AR BW). The second band has 3dB-AR started from 0.78 THz to 0.89 THz (14% 3dB AR BW). This advantage suppresses the need to design many different surfaces for each antenna operating frequency band.

Session Chairs: *Assoc. Prof. Ahmed A. Ibrahim*
Assoc. Prof. M. I. Ahmed

05:15 p.m. – 05:30 p.m.

TS06.2 Development of Koch Snowflake Fractal Type Antenna with DGS For Textile Applications

A.M.M.A Allam[1], Gökberk Akarsu[2], Elif Buse Zengin[2], Diaa E. Fawzy[2] and Hany Taher[3]*

1. Faculty of Information Engineering and Technology German University in Cairo, Egypt,
2. Faculty of Engineering Izmir University of Economics Izmir, Turkey,
3. Walton Institute Waterford Institute of Technology Waterford, Ireland.

Abstract

Recent developments in wearable electronics and smart textiles lead this technology to be used in different industries such as military, heath monitoring, sensor or actuator and energy harvesting. The development of small devices capable of transmitting and receiving data at low power with the highest possible data rates and multi- or wide- bandwidths is required by new applications in the field of smart textile systems. On the same side, shifting carrier frequencies to multi-bands resonances is an important requirement for meeting the long-term needs of the next generations of smart textile based systems.

Antennas are the crucial part of any systems and requires to fit some design requirements. Despite their advantages of being low cost, small size, lightweight simple to develop and to integrate with other circuit components, patch antennas have a limited bandwidth. For this reason, fractal shapes are suggested to be integrated into the design of traditional antennas as a technique to increase their bandwidths. With unique characteristics linked to their geometries, all fractal units have common properties, and their properties can be generated and adjusted by resizing the geometrical structure either by adding or subtracting the fractal elements. One of the common types is the Koch fractal. When compared with conventional antennas, their sizes are smaller with great enhancements in the bandwidth and radiation efficiency.

The main contributions of this study are as follow: (1) develop a textile based wide band compact resonating antenna at the GSM, LTE, and Wi-Fi frequency bands, (2) optimize the antenna geometry comprising two identical slots of concave hexagonal shape, (3) study the antenna performance on different textiles and on a substrate made of combined fabrics to increase the bandwidth.

This work proposes a new textile-based multiband Koch Snowflake Shape Fractal antenna with concave hexagonal shape twin slots. It is optimized for the GSM, Wi-Fi, X and Ku frequency bands for smart textile-based applications. The size of the antenna is 86.4*60mm2. The conductor layer (copper tape) has thickness of 0.035mm. Four textile fabrics are considered as substrates, namely, Felt (εr=1.22), Cotton (εr=1.8), Leather (εr=2.95) and Polyester (εr=1.9) with a thickness of 2mm. The Finite Difference Time Domain (FDTD) method (CST Microwave Studio) is used design and simulate the antenna. The largest bandwidths are achieved on the Felt, -10dB reflection coefficient resonance bandwidths are 2.6GHz, 1.55GHz and 3.7GHz, with radiation efficiencies of about 92%. The flexibility offered by textiles is examined by weaving the four different fabrics into one substrate, the obtained results showed enhancements in the antenna gain and bandwidth at higher frequencies. It is show that, this antenna is a promising design for smart textile applications.

Session Chairs: *Assoc. Prof. Ahmed A. Ibrahim*
Assoc. Prof. M. I. Ahmed

05:30 p.m. – 05:45 p.m.

TS06.3 Design and Implementation of SIGW Based Array Antenna for WiFi Applications

Hesham kamal Khalil[1], M.S.H.Salah El-Din[1], A.M.M.A.Allam[2], Hussein Hamed Mahmoud Ghouz[1] and Mohamed Fathy Abo Sree[1]*
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2. German university in Cairo

Abstract

Almost all commercial wireless communication devices produced today such as smartphones, tablets, laptops and wearable devices are required to support multiple communication standards such as wireless fidelity (WiFi), Bluetooth and long-term evolution (LTE). The idea of internet of things (IoT), where every communication device is connected together, is be realized with a rapid development of new wireless standards with the aims of providing higher data speed, constant connectivity and low implementation cost. The IoT developments are bringing more and more smart devices that depend on wireless connectivity to make our lives easier. This growing demand for robust wireless connection to support the ever-increasing and ever-evolving mobile devices and cloud-based applications and to expand the volume and business in WiFi connected devices capable of operating in WiFi band. Especially in the last decade, the RF module costs have thoroughly got cheaper and 802.11a/b/g/n transceivers have become easily available in the markets. In traditional WLAN, IEEE 802.11 standards are widely adopted for communications over a distance of several tens of meters. WiFi is generally used as a superset of these standards and it has already been a mature technology. Plenty of research works have been conducted on WLAN antennas at 2.4/3.6/4.9/5/5.9/6/60 GHz. In order to support existing wireless networks as well as future generation standards, research towards smart and efficient antenna configurations is vital. Numerous research papers on antenna design in the literature have covered different types of applications ranging from communication to identification and detection applications. The challenge in realizing WLAN system is to design low dispersion, low loss and dual-band antennas with high gain. Recent gap waveguide (GW)-based technologies exhibit promising guiding techniques for microwave and millimeter components compared to their counterpart's classical ones, which suffer from high losses, high dispersion and bulky sizes.
GW technologies comprise of mainly three technologies, namely, the ridge gap waveguide (RGW), groove gap waveguide (GGW) and microstrip gap waveguide (MGW). Substrate integrated gap waveguide (SIGW) is considered a special type of MGW. By replacing air gap with thin substrate, it overcomes manufacturing complexities and adding more stable structure with additional design freedoms. SIGW consists of two parallel plates, one plate with periodic textures to stop the wave propagation in all directions except the required path. These periodic textured cells prevent the leakage and ensure a low dispersion quasi TEM mode inside substrate gap. It has gained a lot of attention during the last decade due to its superior properties compared to conventional guiding structures. It is more advantageous compared to microstrip transmission lines, coplanar waveguide (CPW) and substrate integrated waveguide (SIW), such that it maintains a planar profile and low radiation loss. It can also be implemented without good metal contacts between the parallel metal plates, making the manufacturing process easier and cheaper.
In this work the design of the proposed antenna starts with the implementation of electromagnetic band gap (EBG) structure with SIGW mushroom unit cell . Rogers RO4003C substrate with the dielectric constant of 3.66 and Rogers RO4350B with the dielectric constant of 3.55 are used for the top and lower layer receptivity. The periodicity and mushroom dimensions are optimized to provide the required band gap from 5 GHz GHz to 20 GHz. The dispersion diagram of the SIGW line shows the single quasi-TEM propagating mode along the ridge in the stop band of the periodic structure. The divider is designed to feed the array antenna of two elements on top layer of the SIGW structure, the realized gain and radiation are presented.

Session Chairs: *Assoc. Prof. Ahmed A. Ibrahim*
Assoc. Prof. M. I. Ahmed

05:45 p.m. – 06:00 p.m.

TS06.4 Design and Implementation of Triangular Base Truncated Right Prism Dielectric Resonator Antenna

*Mohamed Atef Abbas, Mohamed Galal Khalil, Sara Yehia abdel fatah, A.M.M.A. Allam, Hesham A.Mohamed and Mohamed Fathy abo sree**

Ain Shams university and AAST , GUC, ECU, GUC, ERI, AAST

Abstract

In the current work, an Ultra-Wide-Band (UWB) truncated right Triangular prism Dielectric Resonator Antenna (TDRA) is presented. The objective is C-band for Wi-Fi applications. A parametric study of different dimensions of the antenna geometry namely, height of TDRA, probe length and position in order to examine the effect of altering these parameters on the bandwidth and gain. The single TDRA shows the highest BW with 44.67 % in average compared to other single and multiple elements of Cylindrical DRA (CDRA) and, Square DRA (SDRA). Consequently, it is used to design an UWB antenna for C-band applications. The antenna is fabricated on a substrate Roger 3010 with thickness 1.27mm, relative dielectric constant 10.2 and loss tangent 0.0022. It conducts bandwidth from 4.45 GHz to 7.01 GHz with good agreement between the measured and simulated results.

Session Chairs: *Assoc. Prof. Ahmed A. Ibrahim*
Assoc. Prof. M. I. Ahmed

06:00 p.m. – 06:15 p.m.

TS06.5 Investigation on 77 GHz Array for Automotive Radar Applications

M. I. Ahmed *

Electronics Research Institute

Abstract

In this paper, we present a corporate series feed microstrip antenna array and a series fed antenna array for 77 GHz automobile radar applications. A 10x1 and 10x2 antenna array with sidelobe levels of -4.2 dB obtained gain of 14.9dBi and 17 dBi, respectively, with bandwidth of 1.2 GHz. In terms of antenna size, affordability, and ease of use, the simulation outputs of this constructed antenna are significantly superior.

Session Chairs: *Assoc. Prof. Ahmed A. Ibrahim*
Assoc. Prof. M. I. Ahmed

06:15 p.m. – 06:30 p.m.

TS06.6 DANA: Deep Attention Network Architecture for Facial Emotions Classification

Hany M. Sadak , Ashraf A. M. Khalaf ,and Gerges M. Salama*

Minia University

Abstract

In this paper, an innovative method is introduced to extract features from images using a new deep learning architecture. Facial emotions recognitions have many applications for example human computer interactions, customer satisfaction analysis and medical treatment in a case like autism to have an accurate model with high accuracy and low loss is a challenging task due to many challenges like small datasets, open environmental conditions, and varies in ages.

deep learning models specially CNN achieved a good performance due to its ability to extract features from images, our model is a new deep learning architecture depends on attentional convolutional network to focus on important parts of the face so focus on important features locations in face which led to improvement in classification task for seven emotions (i.e., Neutral, Angry, Sad, Happy, Surprise, Fear, and Disgust) on datasets, including CK+,FER2013, and JAFFE which achieve better performance than previous models. the accuracy of this paper on the CK+ is 99%.

Session Chairs: *Prpf. Hussein A. Abd-Elmotaal*
Prof. Ahmed Albadawy
Assoc. Prof. Mustafa El-Rawy

08:00 p.m. – 08:15 p.m.

TS07.1 Simulation of Groundwater and Surface Water Interactions under Various Management Scenarios in the Nile Valley, Egypt

Ahmed A. Makhlouf, Mustafa El-Rawy, and Mostafa Deep Hashem*

Civil Engineering Department, Faculty of Engineering, Minia University, Minia 61111, Egypt.

Abstract

Egypt faces a high level of water shortage where 13.5 billion cubic meters should be contrived annually as 79.5 BCM is the annual water needs, and 66 BCM is the total available water. Groundwater is considered the second source of fresh water after the Nile River and is used for irrigation, industrial, and domestic purposes. About 87% of the exploited groundwater is from the Nile Delta and the Nile Valley aquifers. These two aquifers are mainly replenished by the seepage from the River Nile, canals and drains network, and percolation from agricultural water.

The groundwater management of the part of the Quaternary aquifer in Assuit governorate in the Nile valley of Egypt was performed using the MODFLOW groundwater modeling module. This study aimed to assess the behavior of the groundwater aquifer and compare the groundwater heads under different scenarios of recharge and discharge.

The developed groundwater model was calibrated based on twenty-eight observation wells by trial and error method. The calibrated hydraulic conductivities of the upper and lower layers are 2.0 and 50 m/day. The evapotranspiration rate is 3.20 x 10-3 m/day, and the recharge from the irrigation return flow (Agricultural drainage water) is 9 x 10-4 m/day. The calibrated hydraulic conductance for the Nile River and El Fouadeya, El Faroukeya, and Ibrahimia canals range from 50 to 200 m2/day. Calibrated results showed a good agreement between simulated and observed groundwater heads where the root mean square error is 0.74 m with R-square = 0.97, indicating consistent model performance regardless of the limitation of data availability.

Six management scenarios were proposed and analyzed in this study: four scenarios proposed that the abstraction rate be increased by 1.25, 1.5, 2.0, and 2.5 times the current total abstraction volumes from the aquifer; two additional proposed scenarios for reducing Nile River recharge to the aquifer were simulated, proposing a 0.5 m and 1.0 m reduction in the Nile River and irrigation canals in the research area.

According to the findings, the four discharge scenarios have decreasing groundwater heads of 0.17, 0.35, 0.72, and 1.11 m, respectively, whereas the two indicated discharge scenarios had reductions of 0.22 and 0.46 m, respectively, concerning the current situation. It can be recommended that the rate of groundwater abstraction should be managed to avoid drying the aquifer, and the lining of irrigation canals should be considered.

Session Chairs: *Prpf. Hussein A. Abd-Elmotaal*
Prof. Ahmed Albadawy
Assoc. Prof. Mustafa El-Rawy

08:15 p.m. – 08:30 p.m.

TS07.2 Evaluate and study the irrigation water quality, quantity and pump stations in Fayoum and Minia

*Mansour A. M. Yacoub**

Minia Higher Institute for Engineering & Technology

Abstract

Water is the source of life for all creatures, and the axis of sustainable development and improvement. Freshwater represents only 2.5% of the Earth's water. Egypt is one of the arid to hyper-arid countries due to the lack of rainfall. It depends on a major source of water, which is the River Nile; at a constant quota of (55.5 billion m3 /year) according to the River Nile Agreement (1959), to irrigate (8.5 million Fadden) of arable lands. The total population is close to 100 million people living on about 6% of the total land of Egypt. During the last 70 years the population has increased from 20 million (1959) to 110 million (2022). It is expected that the population will rise to 150 million in 2050. Egypt is already known as a water short country and about 550 m3/per capita/year is used, which in 2050 will drop to 400 m3 /per capita/year. To meet increasing demand from all sectors, and ensure the sustainable use of water resources, national water policy documents emphasize that the use of available water resources should be optimized. This study aims to determine several programs have been launched, one important method for this regard in Egypt was improvement and modern irrigation(Canals-Meskas) . This study includes research work, field work and the laboratory analysis process that accomplished along the time of this study. It also includes the important outcome conclusions and recommendations for evaluating and study the irrigation water quality, quantity and pump stations in Fayoum and Minia" In order to evaluate and study the irrigation water quality, quantity and pump stations in Fayoum and Minia", the following three water factors verified and assessed, for the interventions were identified from all concerned actions financed by EU-JRDP and implemented by TTC and ICPW.

Session Chairs: *Prpf. Hussein A. Abd-Elmotaal*
Prof. Ahmed Albadawy
Assoc. Prof. Mustafa El-Rawy

08:30 p.m. – 08:45 p.m.

TS07.3 Developing a Pavement Condition Monitoring System and Maintenance Decision Selection for Road Networks

Mostafa Deep Hashem, Afaf A. Mahmoud, Mohamed A. Abd El moez, Hamdy B. Faheem*

Civil Engineering Department, Faculty of Engineering, Minia University.

Abstract

Road networks are one of the most important transportation system components, so, recently, all efforts have focused on eliminating the annual cost lost in random maintenance decisions by applying the Pavement Maintenance Management System (PMMS). The main aim of the PMMS system is included in the provided framework that helps decision-makers select the ideal treatment decisions. To achieve this aim, this paper addresses the ability to provide a framework in a detailed description of all types of flexible pavement distress and the methods of determining the appropriate maintenance or rehabilitation (M & R). A database was created for a surveyed 8.25 km of the Cairo-Aswan Agriculture Road, Minia Governorate, Egypt. A detailed data of all types of flexible pavement distress found in the study area was collected and then stored in a database file using GIS software. Then, using the PAVER 5.2.3 software, the pavement condition index (PCI) was calculated based on the stored data in order to evaluate M & R strategies. The obtained results were expressed by the PCI for branches 1 and 2 and were 59 and 48, respectively. These findings indicate that the appropriate M & R for branch 1 is "Thin Overlay without Milling," and branch 2 is "Milling and Overlay."

Session Chairs: *Prpf. Hussein A. Abd-Elmotaal*
Prof. Ahmed Albadawy
Assoc. Prof. Mustafa El-Rawy

08:45 p.m. – 09:00 p.m.

TS07.4 Defining a Unified Height System for Egypt using Relativistic Geodetic Approaches

Mostafa Ashry[1,2,3], Wen-Bin Shen[2,3], Ziyu Shen[4], Zhang Pengfei[3]. Abdelrahim Ruby[2,3,5], and Hussein A. Abd-Elmotaal[1]*

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4. School of Resource, Environmental Science and Engineering, Hubei University of Science and Technology, Xianning 437100, China.
5. Geomatics Engineering Department, Faculty of Engineering at Shoubra, Benha University, Cairo 11629, Egypt.

Abstract

Establishing an International Height Reference Frame (IHRF) has been a major goal of the International Association of Geodesy (IAG) for a long time. The scope of this study is to define a unified height system for Egypt using the advantages of relativistic geodetic approaches via spatial time-frequency links. We propose a ground clock network connected with frequencies transferred by the ACES (Atomic clocks ensemble in Space). The gravitational potential of the ACES will be determined using a gravity field model. The ground stations include stationary clocks as the backbone of the frame. Frequency transfer between the ACES and these stations will be simulated. The gravitational potential differences between the ACES and the ground stations will be computed using the tri-frequency combination method. Finally, the gravitational potential of the ground stations will be determined and converted to orthometric height. The TFC uses the uplink of carrier frequency 13.475 GHz (Ku band) and downlinks of carrier frequencies 14.70333 GHz (Ku band) and 2248 MHz (S-band) to transfer frequency signals. Here we present a simulation experiment. This experiment uses the international space station (ISS) orbit data, ionosphere and troposphere models, regional gravitational potential and geoid for Africa, solid Earth tide model, and simulated clock data by the conventionally accepted stochastic noises model. We consider various effects, including the Doppler effect, second-order Doppler effect, atmospheric frequency shift, tidal effects, refraction caused by the atmosphere, and Shapiro effect, with accuracy levels of decimetres. The simulation study shows that the Doppler frequency shift is the most important part. The Shapiro frequency shift is the smallest part. The relativistic frequency shift includes the gravitational redshift and the lateral Doppler effect. The refraction effect cannot be ignored, it is much larger than the ionospheric frequency shift and the tropospheric frequency shift. In the experiment, although the residuals of some errors (especially the high-order terms of the ionosphere) are larger than 10−16, due to the randomness of the errors, simulation experiments show that after long-term averaging, it can be less than 10−16.

Session Chairs: *Prpf. Hussein A. Abd-Elmotaal*
Prof. Ahmed Albadawy
Assoc. Prof. Mustafa El-Rawy

09:00 p.m. – 09:15 p.m.

TS07.5 The Updated Gravity Database for Africa using RTM Technique

Hussein A. Abd-Elmotaal[1], Norbert Kühtreiber[2], Kurt Seitz[3], Bernhard Heck[3]

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2. Institute of Geodesy, Graz University of Technology, Steyrergasse 30, A-8010 Graz, Austria
3. Geodetic Institute, Karlsruhe Institute of Technology, Englerstraße 7, D-76128 Karlsruhe, Germany

Abstract

In the framework of the activities of the IAG sub-commission on gravity and geoid in Africa, it is needed to have a uniform gridded gravity data set to determine the earth's mathematical surface (the geoid) in Africa using Stokes' integral in either the frequency or space domain. The available gravity data set for Africa consists of land point gravity data as well as shipborne and altimetry-derived gravity anomaly data. The available gravity data set has significantly large gaps, while in some particular areas the distribution is fairly dense. Also the shipborne and altimetry data have a line structure (along tracks). This leads to a problem in determining a reasonable empirical covariance function, and consequently limits the capability of the used least-squares prediction technique. Filtering the available gravity data and degrading the ocean gravity data took place to overcome this problem. The establishment of the updated gravity database for Africa has been carried out using the well-known RTM reduction technique, employing a weighted least-squares prediction technique. The land gravity data get the highest precision, while the shipborne and altimetry gravity data get a moderate precision. The data gaps are filled with gravity anomalies derived from the GOCE DIR_R5 global reference model, getting the lowest precision within the prediction technique. The weighted least-squares prediction technique is thus carried out to estimate gridded gravity anomalies. The updated gravity database on a uniform 5' × 5' grid has been established by the developed process after performing the proper RTM restore step. The precision of the developed gravity database is tested on internal and external levels. A comparison with the previous gravity databases for Africa is made and extensively discussed.

Session Chairs: *Prpf. Hussein A. Abd-Elmotaal*
Prof. Ahmed Albadawy
Assoc. Prof. Mustafa El-Rawy

09:15 p.m. – 09:25 p.m. (Online)

TS07.6 Investigation the Use of Wasted Plastic in Asphalt concrete Mixtures

Essraa Barhoum Ali Abdo[1], Hassan Younes Ahmed[2], Abdel Rahmen Megahid Ahmed[3]*

1. B.Sc., Civil Engineering Department, 15th May High Institute Of Engineering , 2013.
2. Prof. of Highway and Airport Eng., Faculty of Engineering, Assuit University.
3. Prof. of material Eng., Faculty of Engineering, Assuit University.

Abstract

The purpose of this research is to investigate the possibility of using wasted plastic as a polymer Additives for asphalt concrete mixtures. Many investigators have used plastic waste in asphalt mixture. This research clarify the point of eco-friendly Environment. Through replacing specific percent of plastic waste in asphalt mixtures. There for, plastic wastes are collected from different dumps of garbage. Manually and mechanically plastic waste is shredded ,heated with course aggregate separately, then added to the hot asphalt mix . Replacement of aggregates by plastic in asphalt mixes is done with 6%, 8%,10%,12%.and 14% Mixtures containing shredded polyethylene showed improvement with respect to the Marshall stability, flow properties. Laboratory aging procedures have been set up to simulate the ageing process through the use of accelerated tests. The properties of modified mixture indicated that the addition of polyethylene improved the mixture properties .Finally it could improve the level of performance and the service life of the road. It can be sum up that the High Density Poly Ethylene (HDPE) modified mixture asphalt gives more advantages compared to the traditional one. Having considered the environmental and economical ,HDPE modified asphalt mixture is found suitable to be used for road pavements .It's found that plastic mixture significantly improve the mechanical properties and performance of asphalt mixture .Compared with traditional mixture, the HDPE modified mixtures had higher resistance of water susceptibility, where the indirect tensile strength test (ITS) results values for the modified mixtures had higher value than the traditional mixtures. This is may be attributed to that the HDPE prime-coated, which would be critical for improving moisture susceptibility. Density and Percent Voids of Asphalt Samples because of lesser density of plastic aggregates, asphalt samples made of replaced plastic aggregates gives lower densities results with increasing plastic aggregates percentage.

Session Chairs: *Prpf. Hussein A. Abd-Elmotaal*
Prof. Ahmed Albadawy
Assoc. Prof. Mustafa El-Rawy

09:25 p.m. – 09:35 p.m. (Online)

TS07.7 I Assessment of the Pozzolanic Activity of Some Available Local Mineral Concrete Admixtures

*Abdel Rahman A. Megahed, Mohamed M. Rashwan, Omer Farghal, Mohamed Sayed. Eissa**

PhD researcher in Civil Engineering Department, Faculty of Engineering, Assiut University.

Abstract

This current paper aims to assess the pozzolanic activity of some available local mineral admixtures before using to enhance the engineering properties of structural concrete that's because, there is no standard specification on Egyptian Standard Specification (ESS) to be used for evaluation of the pozzolanic activity and suitability of available mineral admixtures as a pozzolanic supplementary cementing materials. For this purpose, seven physico-chemical-mechanical methods have been used to enable of evaluating of pozzolanic activity and makes a comparison between different tested admixtures. Where, Particle size and fineness was evaluated via visual assessment and by nitrogen adsorption method (BET). The chemical analysis of these local admixtures was determined by X-ray fluorescence (XRF) test. As well as, in order to check the disappearance of the characteristic peaks of these admixtures, X-ray diffraction (XRD) testes were carried out. Scanning Electron Microscope (SEM) was used to investigate the microstructure. To quantify the potential contribution of mineral admixtures on the mechanical behavior, Strength activity index (SAI) and Hydraulic Pozzolanic Factor (HPF) were conducted on mortar mixes containing these admixtures.

The available tested local admixtures are three types of produced local metakaolins (MK24, MK33 and NMK), calcined ball-clay (CBC), ground broken bricks (GBB) and blast furnace slag (BFS). On the other hand, commercially fly ash (FA) was also used and tested in compression. The results of this study concluded that, the used methods might be effectively assisted in the evaluation of Pozzolanic activity in improving strength of cement concrete.

Session Chairs: *Prof. Nasser A. M. Barakat*
Prof. M.R. El-Aassar

08:00 p.m. – 08:15 p.m.

TS08.1 New Insight in Sewage Wastewater Treatment: Electrical Energy Generation using Microbial Fuel Cells

Nasser A. M. Barakat, Rasha H.Ali, Mamdouh M .Nassar, Olfat A.Fadali and Marwa A.Ali*

Chemical Engineering Department, Faculty of Engineering, Minia University, Minia 61519, Egypt

Abstract

The conventional processes for sewage wastewater are highly energy consumable operations so the operating and capital costs are high. Microbial fuel cells (MFC) have lately gotten a lot of press because of its promise for long-term wastewater treatment and pollutant removal[1]. MFC is a bioelectrochemical device that uses electrons produced from the anaerobic oxidation of substrates to create power. The MFC is made up of two parts: an anode and a cathode that are separated by a proton exchange membrane (PEM) [2]. Sewage wastewaters have a variety of organic pollutants which can be digested by the local microorganisms[3]. Accordingly, if there is enough electrogens microorganisms exist in this wastewater, the MFCs provide double benefits; renewable energy generation with simultaneous treatment. In this study, a sewage wastewater obtained from local treatment plant in El-Minia city was utilized as a model to investigate the capability of the MFCs in generation of electrical energy. Several materials have been investigated as anode; carbon paper, carbon cloth, carbon felts and carbon nanofibers. However, Pt/C-loaded carbon cloth (0.05 g/cm2) was used as cathode. The obtained results are promised as a considerable amount of electrical power could be generated. However, the cell activity strongly depends on the anode type. Typically, the best cell performance is related to carbon felt followed by carbon nanofibers, carbon cloth and finally the carbon paper. Numerically, the generated power density was 19.8, 3.8, 3.5 and 0.95 mW/m2 when carbon felt, carbon nanofibers, carbon cloth and carbon paper was used as anode, respectively. Overall, this study changes the classical manipulation for the sewage wastewater to be invoked as a renewable energy source.

Session Chairs: *Prof. Nasser A. M. Barakat*
Prof. M.R. El-Aassar

08:15 p.m. – 08:30 p.m.

TS08.2 Enhanced Decontamination of Direct Rd 81 Dye from Wastewater using Zn(II) L-Aspartic Acid Metal-Organic Framework

Eslam Salama, Mohamed Ghanim, Hassan Shokry Hassan, and Marwa F. Elkady, and Mona Ossman*

Environment and Natural Materials Research Institute (ENMRI), City of Scientific Research and Technological Applications (SRTA-City), New Borg El-Arab City, Alexandria 21934, Egypt

Abstract

In the current study, a high surface area Zn L-Asp bio-MOF was synthesized and evaluated as an efficient adsorbent for Direct Red 81 (DR-81) from polluted water. The fabricated bio-MOF was characterized via X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), field emission transmission electron microscopy (FETEM), thermal gravimetrical analysis (TGA), and surface area analysis (BET). The produced bio-MOF has large surface areas (180.43 m2 g-1) and large mesopore volume (0.144 cm3 g-1), as well as good chemical inertness and mechanical stability. The feasibility of synthesized Zn MOF for DR-81 decontamination from aqueous solutions was established using the batch technique. The optimum dosage from the Zn MOF for 95.3% adsorption of 10 ppm DR-81 was 1.0 g L-1 at pH=7 after 45 min. Thermodynamic analysis results demonstrated that the decontamination processes were done with spontaneous, thermodynamically, and exothermic nature onto the fabricated bio-MOF. Kinetic parameters were well-fitted with pseudo-second-order kinetics and adsorption was described by the Freundlich isotherm. The adsorption data proved that Zn L-Asp bio-MOF is an effective adsorbent for DR-81 from aqueous solutions with high stability and also has the ability to be recycled for eight cycles, as well as an easily regenerated form of the sorbent.

Session Chairs: *Prof. Nasser A. M. Barakat*
Prof. M.R. El-Aassar

08:30 p.m. – 08:45 p.m.

TS08.3 Nanocomposite Functionalized with Polyaniline Nanoparticles as Nano-Adsorbent of Phenolic Pollutants from Water

M.R. El-Aassar, Omar M. Ibrahim, F.S. Hashem, A. S. M. Ali, and A. A. Elzain*

Polymer Materials Research Department, Advanced Technology and New Material Institute, City of Scientific Research and Technological Applications (SRTA-City), New Borg El-Arab City, Alexandria 21934, Egypt,
Department of Medicine, Washington University School of Medicine, St Louis, Missouri, United States,
Chemistry Department, Faculty of Science, Ain Shams University, P.O. Box 1156, Cairo, Egypt

Abstract

Since water pollution with phenolic compounds is a global threat to human and animal health and the environment, we developed stable, eco-friendly, and non-expensive Polyaniline/β-Cyclodextrin (PANI/βCD) nanocomposite via oxidative polymerization for phenol adsorption from water waste. The synergistic modification of PANI with βCD and fabrication of the composite in the nanoscale, led to 66% reduction in particle size from 59 nm (PANI) to 20 nm (PANI/βCD), in addition to, superior phenol adsorption. The prepared PANI/βCD nanocomposite was characterized using Fourier transform infrared spectroscopy (FT-IR), X-ray diffraction (XRD), scanning electron microscope (SEM) and thermogravimetric analysis (TGA). Gas chromatography system connected to mass spectrometry (GC-MS) was used for quantitative analysis of phenol, utilizing selecting-ion monitoring (SIM) technique for better detection and accuracy of phenol. Our results show that the optimum conditions for phenol adsorption; time (50min), pH (8.0) and nanosorbent dose (0.5g) and the adsorption isotherm follows Langmuir model that can be described using the pseudo 2nd order model.

Session Chairs: *Prof. Nasser A. M. Barakat*
Prof. M.R. El-Aassar

08:45 p.m. – 09:00 p.m.

TS08.4 Recent Advanced Techniques in Oil/Water Treatment

Dina M. Sorour, Eman A. Ashour, and Marwa Shalaby*
faculty of engineering Minia university

Abstract

Now adays large amount of oily wastewater have been produced from many industries. The main challenge of oily wastewater treatment is separate the stable emulsified oil particles from water. Therefore, Membrain technology has been intensively applied for treatment of oily wastewater in recent years as ultrafiltration membrains (UF). Generally, polymeric membrains are playing a vital role in these processes because of their easy and low-cost processing as well as their high flexibility. Recently, poly-vinyl chloride (PVC) aroused great attention in separation oily wastewater because of it is interesting physical, chemical and thermal stabilities, superior mechanical strength, low price, long lifespan and solubility in different solvents such as tetrahydrofuran (THF), dimethylformamide (DMF), N,N-dimethylacetamide (DMAc) and N-methylpyrrolidone (NMP) also PVC membrains are prone to fouling and have low flux caused by their tendency to wrinkle during phase inversion and hydrophobic nature. Many types of additives are added to based polymer to increase it is hydrophilicity and increase it is properties such as enhance pure water flux (PWF). Additives added such as inorganic nanoparticle as silver (Ag), titanium oxide (Tio2), silica (Sio2), alumina (Al2O3), iron oxide (Fe3O4) and zinc oxide (ZnO). These nanoparticles increase pure water flux compared to the pure membrain. Also adding polymeric additives to based polymer such as polyvinyl-pyrrolidone (PVP), polyetherimide (PEI), polyethylene glycol (PEG) and polyether sulfone (PES) increase water flux and lower fouling done. PVP with MWt10kDa especially give excellent result in the process because molecular weight of 10KDa helped to increase the hydrophilicity of PVC membrains and thus helped to improve the performance of ultrafilteration in terms of higher permeability and reduce fouling so modified flat sheets PVP (UF) membrains were synthesized by phase inversion method using water as non-solvent. Modified PVP membrains were prepared using different polymeric additives as PVP. Since the effect of additive pvp on pvc membrains was observed by the reduction in water contact angle from 75o to about 53.5o and increasing the wettability and swelling property. The membrains were evaluated in a lab scale cross flow system with synthesis oily wastewater as feed. Fabricated membrains were characterized via contact angle for prepared membrains to examine the degree of hydrophilicity by a contact angle goniometer, field emission scanning electron microscope (FESEM) to visualized the top surface and cross-section morphology of additive added to based polymer (PVC), tensile testing, pure water flux and atomic force microscopy (AFM).

Session Chairs: *Prof. Nasser A. M. Barakat*
Prof. M.R. El-Aassar

09:00 p.m. – 09:15 p.m.

TS08.5 High Valuable Magnetic Activated Graphene from Polyethylene Terephthalate Plastic Waste as Efficient Adsorbent Materials

Marwa Elkady[1], Eslam Salama[2], and Hassan Shokry[3]*

1. Chemical and Petrochemical Engineering Department, Egypt-Japan University of Science and Technology, New Borg El-Arab City, Alexandria, Egypt
2. Environment and Natural Materials Research Institute (ENMRI), City of Scientific Research and Technological Applications (SRTA-City), New Borg El-Arab City, Alexandria, Egypt
3.Environmental Engineering Department, Egypt-Japan University of Science and Technology, New Borg El-Arab City, Alexandria, Egypt

Abstract

In order to safe clean environment, the Polyethylene terephthalate (PET) waste plastics was converted into valuable graphene material via thermal pyrolysis. The synthesized graphene (SG) was chemically activated into activated graphene (AG) through alkaline impregnation followed by co-precipitation of iron oxide nanoparticles to finally produce a novel nano-ferromagnetic activated graphene (NFMAG). The physicochemical properties of fabricated SG, AG and NFMAG were identified using various techniques. The crystalline and morphological structures of the various produced SG, AG and NFMAG materials were investigated using X-ray diffraction (XRD) and scanning electron microscopy (SEM), transmission electron microscopy (TEM) respectively. The microporous structure of the prepared materials was detected using BET surface area analysis that confirms the high surface areas of SG, AG and NFMAG 391.06, 460.01 and 319.62 m2 g-1 respectively. The different prepared materials were evaluated as adsorbent for methylene blue (MB) dye decolorization. The effect of various dye decolorization processing parameters were evaluated. A maximum monolayer adsorption capacity (qm) of 216.83, 348.30 and 291.78 mg g-1 were obtained for SG, AG and NFMAG respectively. The kinetics of the adsorption process for all prepared adsorbents followed the pseudo-second-order kinetics model and Langmuir adsorption isotherm. NFMAG exhibited excellent stability and reusability due to its ease of magnetic properties.

Acknowledgment:

This paper is based on work supported by the Science, Technology & Innovation Funding Authority (STDF) under Grant (46138).

Session Chairs: *Prof. Ramadan Bassiouny*
Prof. M. Mourad

08:00 p.m. – 08:15 p.m.

TS09.1 Enhancement of gas turbine performance by using fogging system

*M. M. Ammara, M. S. Hassan, Mohamed R. O. Ali**

Upper Egypt Electricity Production Company 750 MW Korymat Power Plant, EGYPT bMechanical Power Engineering & Energy Department, Faculty of Engineering, Minia University, Minia, Egypt

Abstract

Gas turbine power plants are widely utilized for power generation around the world because they are inexpensive, easy to install, and provide grid stability. Even so, the high ambient temperature has negative effect on the performance. Therefore, on hot summer days, the power demand rises but gas turbine power decreases. The economical solution for this is to use fogger cooling instead of adding another gas turbine.

This paper investigates the performance enhancement due to cooling the air entering the compressor of combined cycle power station located at Kurimat, Benysuif, Egypt. Fogging technique was utilized in this power station. In this paper the performance of the power station with fogger cooling was compared with the case without cooling in winter.

At first, to predict the potential of using such type of cooling in Benysuif weather condition, the cooling degree hours were calculated for different base temperatures. The results showed that for a base temperature of 20 C, the degree hours for months of May, June, July, August, September were 5934, 7070,7848, 7507, and 5520 respectively. The average difference between the dry and wet bulb temperature during the period of fogger operation in summer was 17 C in May and June. It means that there is high potential for cooling gas turbine air by fogging system, in BeniSuef for 5 months of summer.

Plotting the data on the psychrometric chart showed that the fogger is able to cool 640 kg/s air during summer from ambient air temperature ranged from 30 C to 40 C to a lower temperature ranged from 18 C to 24 C. It means that there is high potential for cooling gas turbine air by fogging system, in BeniSuef .

According to the findings, using an inlet fogging system boosts output power generation and electric efficiency over the course of three months (May, June, and July). From the measured data in summer with fogger cooling, the power increased 0.6% for each 1 C decrease in air temperature. While it is 0.47 % in winter.

The electric efficiency of the gas turbine cycle increases 0.11% for each 1 C decrease in air temperature for the case of cooling with fogging and the case of cooling without fogging in winter. Cooling with fogging system showed an electric efficiency o.7% higher than cooling in winter without fogging.

A 10 C decrease in compressor inlet temperature leads to 20 C in compressor outlet temperature. A 6 C decrease in compressor outlet temperature in case of cooling with fogging compared with cooling without fogging.

The specific fuel consumption increases 0.018% for every 10% increase in relative humidity in case of cooling without fogging. The system also showed a remarkable improvement in fuel savings from 1.5% to 2%.

Session Chairs: *Prof. Ramadan Bassiouny*
Prof. M. Mourad

08:15 p.m. – 08:30 p.m.

TS09.2 Numerical Investigation of Hydro-turbine in Tidal Power Applications

*Omnia Nawar**

Mechanical Engineering Department, Faculty of Engineering, Alexandria University

Abstract

Nowadays, policies are being developed in many countries in order to decrease their greenhouse gases emissions. In this regard, some technologies are widely used as wind and solar energies. This also includes the sea energy that seems to have a vital role in both medium- and long-terms.

The ocean stores enough energy in the form of heat, currents, waves and tides. To meet the tremendous energy demand, tidal power has the advantages of being highly predictable compared to other renewable energy resources.

In this paper, a 3D numerical simulation using the ANSYS FLUENT CFD package was conducted to investigate the effect of different design parameters of the turbine on its performance. These design parameters include the angle of attack, number of blades, arrangement of blades and tip speed ratio. The numerical model was validated against experimental data from literature.

The optimal design conditions of the turbine were defined to ensure the highest possible efficiency.

Session Chairs: *Prof. Ramadan Bassiouny*
Prof. M. Mourad

08:30 p.m. – 08:45 p.m.

TS09.3 Experimental Study of Gaseous Fuel Inverse Diffusion Flame

I.A. Ibrahim[1], I. K. Kashef[2], and H.M. Gad[1]*

1. Mechanical Power Engineering Department, Faculty of Engineering, Port Said University, Port Said, Egypt
2. Mechanical Power Engineering Department, High Institute of Engineering and Technology in Arish, North Sinai, Egypt

Abstract

Diffusion flame represents one of the most common flame configurations in combustion systems. The main aim of the present work is studying the effects of swirl number and equivalence ratio on the combustion characteristics of liquefied petroleum gas (LPG) for normal diffusion flame (NDF) and inverse diffusion flame (IDF). The effects of different swirl numbers of 0.5, 0.75,1.0, and 1.5 are studied at an equivalence ratio of 1.0. In addition, the effect of different equivalence ratios of 0.75, 1.0, 1.5, and 2.0 at a swirl number of 0.5 are studied. The flame shape, visible flame length, temperatures distributions and species concentrations are measured. To study the above parameters, a test rig that consists of the air supply line, fuel supply line, and burner head is designed and constructed. The results showed that, by increasing the swirl number, the visible blue zone is extended and the IDF luminous zone are shortened, and flame length is decreased for IDF and NDF. Moreover, by increasing Φ, the visible flame length increases and the maximum temperature decreases. Also, the concentrations of NO, CO2 and CO are increased until reach their maximum value. While the concentrations of O2 are decreased. IDF emits less CO and NO than NDF, so it is more suitable for environmental preservation.

Session Chairs: *Prof. Ramadan Bassiouny*
Prof. M. Mourad

08:45 p.m. – 09:00 p.m.

TS09.4 Modeling of the Performance Hybrid of Solar Dish Concentrator with Multi Effect Desalination Process and Energy Analysis

Moustafa Mahmoud Aboelmaaref, Jun Zhao, Alaa A mahmoud, Mahmoud salem Ahmed, and Elsaid, Ashraf Elsaid,*

Mechanical Department, Faculty of Technology and Education, Sohag University, Sohag, 82524, Egypt.

Abstract

The development of a thermodynamically modeled hybrid commercial Solar dish with a multi-effect desalination process is conducted in this study with a rated concentrate thermal and a receiver temperature of 853 K. The mathematical model implemented in the MATLAB software was developed to simulate the proposed SDC/MED system and analyze its performance under the conditions of Tianjin, China. An analysis of the daily and annual performances of the investigated SDC/MED system is performed. In addition, energy analysis viability for assessing the life cycle of the SDC/MED system is also performed. The results showed that the desalinated water production for the proposed SDC/MED system is satisfactory with the variations of solar radiation throughout the day. On the other hand, the proposed SDC/MED system is economical and simple compared to other desalination systems. The results of simulated MED of five effects show total productivity of about 95.5 g/s, specific cooling water flow rate = 1.689, and performance ratio = 223.3.

Session Chairs: *Prof. Ramadan Bassiouny*
Prof. M. Mourad

09:00 p.m. – 09:15 p.m.

TS09.5 The Role of Carbonization/Torrefaction on Valorization of Biomass

*Ahmed Elwardany**

Alexandria University, Egypt-Japan University of Science and Technology

Abstract

Energy and environmental issues are currently attracting researchers to invest time and efforts on them. Hence, renewable energy resources are one of the most important topics in today's research. This includes solar, wind, wave, tidal and biomass energies. The latter one has a main advantage over the others of being consistent. However, biomass has many routes to be used or valorized by. These routes include thermo-chemical or bio-chemical methods. In this paper, the thermo-chemical method is of interest. Thermo-chemical conversion processes include pyrolysis, combustion, carbonization, gasification, co-firing and liquefaction. Among these methods, carbonization is the main interest of the current work. In this process, the biomass is heated under inert conditions to produces charcoal. In this regard, a torrefaction process was conducted for bean straw at different temperatures of 200 and 300 C and different residence times of 30 and 60 minutes. The results show a mass yield of about 91% and 75% for 30 minutes torrefaction at 200 and 300 C, respectively. This was reduced to 88% and 65% for the 60 minutes torrefaction case. The energy yield was also measured using bomb calorimeter. It was revealed that the energy yield of the case on 30m/200C is the highest one with value of 94%. It was also shown the crystallinity of the torrified biomass was decreased with the temperature. The functional groups were also monitored using FTIR and the results are also reported.

09:15 p.m. – 09:30 p.m.

TS09.6 Technical and Economical Evaluation of The Enhancement of El Korymat Gas Turbine Power Station Using Air Cooling Fogging System

Hamada saad mohamed ali *

Mechanical Power Engineering & Energy Department

Abstract

El Korymat power plant is a 750 MW combined cycle power station consists of 2*264 MW gas turbine units and a 250 MW steam turbine. It is manufactured and installed by Siemens (V94.3A2) in 2008. However, the power drops significantly in summer at the time of the day when the load curve reaches its peak of power demand. This is due to the change of weather conditions and the air quality. Therefore, installing cooling system to cool air before entering the compressor is essential.

The literature shows that different scenarios are used to fulfill this cooling. It depends mainly on the weather at the site location of the power station. Two main important types of cooling are available in Egypt, these are the fogging cooling system, and the media cooling system. The weather at the site plays a significant role on the choice of the type of cooling.

This study aims to evaluate the effect of time of fogging cooling system in El korymat on its performance and the economics of the process. This is to be done through the analysis of the data gathered from the station during year 2018 was used in this evaluation. The data showed that the power and specific fuel consumption is linearly related to the inlet temperature. By curve fitting, these relations were obtained. The hourly variation of the power, efficiency, and specific fuel consumption as performance indicators were given for representative days of summer period were given.

Based on these curves, an economic study was made for both 4 hours and 10 hours operation. The economic indicators such as the net present value (NPV), internal return rate (IRR), rate of return (ROR), and pay pack period were obtained for different tariffs of electricity. The data of this study is considered as a valuable tool for the decision maker in case of exporting electricity to the neighboring countries. Specially that Egypt has many gas turbine power stations needs modifications to allow for the enhancement of fogger cooling.

The results showed that the maximum increase in power is from 12 to 15 MW in case of 4 hr operation. It reaches a maximum of 20 MW in case of 10 hrs operation. The maximum difference between dry and wet bulb temperature was 15 ºC at the time of maximum needed power demand. The best time of fogger operation was from 10 AM to 8 PM. The specific fuel consumption in May without fogging changed from minimum value of 0.214 kg/kWh to a maximum of 0.219. In case of fogger operation, it tends to be constant at 0.214 kg/kWh. The study showed that there is no economic justification when operating the fogger 4 hours and with electricity price less than 80 $/MWh.

Session Chairs: *Prof. Gamal El-Din Ali Abouelmagd*
Prof. Moustafa Mahmoud Moustafa

09:00 a.m. – 09:15 a.m.

TS10.1 Parametric Analysis on The Performance of a Hybrid Absorption Desalination-Cooling System

El-Sadek H. NourEl-deen, and K. Harby*

Department of Mechanical Power Engineering, Faculty of Engineering, Minia University

Abstract

The demand for new technologies due to the global energy shortage, water scarcity, and environmental issues have been a scientific worry and challenge all over the world nowadays. Conventional desalination and cooling systems consume a large amount of energy and harm the environment. In the actual study, performance of a proposed hybrid absorption-desalination cooling system (ABDCS) is investigated theoretically. The main advantage of this system is the ability to utilize effectively low-grade heat source to produce simultaneously both desalinated water and cooling effect. A mathematical MATLAB code is developed and validated to simulate the performance of the system.

Results showed that, the maximum system COP is obtained at 85 oC driving heat source temperature. This makes the proposed system suitable for low-grade heat sources and heat recovery process, which can be easily obtained from low grade heat source. At this temperature, the obtained cooling effect is 346 kW, the coefficient of performance (COP) is 0.774, and 13.88 m3/day desalinated water production. Increasing heat source temperatures and cooling water temperatures increasing the STEC linearly from 754 to 806 kWh/m3 and from 722 to 812 kWh/m3 respectively along the range of temperatures tested. On the other, the STEC decreased from 814 to 716 kWh/m3 with increasing in the chilled water.

Session Chairs: *Prof. Gamal El-Din Ali Abouelmagd*
Prof. Moustafa Mahmoud Moustafa

09:15 a.m. – 09:30 a.m.

TS10.2 Effect of Infill Pattern and Raster Angle of the 3D Printer on the Mechanical Properties of PLA+

Ahmed Moustafa Abd-El Nabi, Ahmed Mohamed Mahmoud Ibrahim, Moustafa M. Moustafa, and Wagih W. Marzouk*

Production Engineering and Mechanical Design Department, Faculty of Engineering, Minia University

Abstract

Preserving the environment from contamination needs to use of biodegradable materials in the industrial field. Polylactic Acid (PLA+) is one of the newest biodegradable materials seeking entrance into the industrial field. Furthermore, Additive manufacturing or 3D printing, especially the fused deposition modeling (FDM) technique, witnesses obvious progress in the industrial field because of 3D printing's advantage in producing complex shapes. This paper aims to find out the effect of changing both the infill pattern and raster angle on the mechanical properties of polylactic acid (PLA+). Many samples were fabricated in 9 different infill patterns, cubic subdivision, grid, gyroid, lines, octet, quarter cubic, triangles, tri-hexagonal, and zig-zag, and different raster angles, 0˚, 30˚, 45˚and 90˚.

3P- bend tests were conducted to evaluate the combination between infill pattern and raster angle upon mechanical proprieties of printed specimens.

The experimental results show that octet infill pattern with a raster angle of 0˚ possesses the highest flexural load compared to the other 8 patterns. This could be attributed to its complex shape, which helps to resolve the applied flexural load into different components in different orientations.

Session Chairs: *Prof. Gamal El-Din Ali Abouelmagd*
Prof. Moustafa Mahmoud Moustafa

09:30 a.m. – 09:45 a.m.

TS10.3 Effects of Alloying Elements and Strain Rate on The Mechanical Characteristics of Various Alloy Steels

Hesham A. Omran, Moustafa M. Moustafa, Samy. Z. Al-Abdeen, and Asaad A. Mazen*

Faculty of Engineering Minia University

Abstract

Nowadays, Alloy steels have excessive progress because of their frequent uses in many fields, especially in the industrial field. In this paper, the influence of alloying elements and strain rate on the mechanical characteristics of various alloy steels was investigated. Tension and hardness tests were carried out with three different strain rates (5, 10, and 50 mm/min) on different alloy steels X40CrMoV5-1, X153CrMoV12, and X38CrMo16. In addition, the microstructure of the tested alloy steels was observed. From this study, it is concluded that the increased chromium percentage increases the mechanical properties of tested alloys. This may be referred to the increasing chromium percentage which enhances the dislocation density of the strained Cr-alloyed steel specimens as well as increases yield strength. Moreover, increased strain rate prevented dislocation entanglement and strain hardening in strained Cr-alloyed steel.

Session Chairs: *Prof. Gamal El-Din Ali Abouelmagd*
Prof. Moustafa Mahmoud Moustafa

09:45 a.m. – 10:00 a.m.

TS10.4 Novel Eco-Friendly Cooling/Lubrication Approach During the Grinding of TI Alloys

Ahmed Mohamed Mahmoud Ibrahim, and Wei Li*

Production Engineering and Mechanical Design Department, Minia University, Egypt, 61519

Abstract

In the last few years, most countries all over the world have established strict regulations to sustain the environment. Since conventional metalworking fluids (MWFs) are classified as extremely harmful materials for the health and the environment. Thus, costly post-treatment for the MWFs is required. Surfactant-free palm oil-based nanofluid containing graphene nanoplatelets (GNPs) with percentages of 0.03 wt.%, 0.1 wt.%, 0.2 wt.%, 0.3 wt.%, 0.4 wt.%. were prepared and tested. For more economic lubrication, Minimum Quantity Lubrication (MQL) has been applied to deliver the nanofluids into the cutting zone in the form of mist with a liquid flow rate of 0.4 L/hr. Furthermore, graphene nanoplatelets dispersed in water have been prepared with a concentration of 0.15mg/ml. The grinding, tribology, SEM, EDX, and Raman spectroscopy tests revealed that the graphene nanoplatelets could decrease the specific grinding energies by 68.16%, 91.78%, and 88.63%, 87.54%, 86.14% at GNPs contents of 0.03 wt.%, 0.1 wt.%, 0.2 wt.%, 0.3 wt.%, 0.4 wt.% respectively compared to dry cutting. Furthermore, the reduction in the cutting energy compared to commercially Acculube LB2000 was 22.69%, 80.25%, 72.39%, 69.74%, and 66.35% respectively at the same graphene nanoplatelets percentages. Furthermore, Water/graphene nanofluid outperformed the dry and flood cutting in terms of energy consumption, surface finish, and friction coefficient. This behavior is attributed to the enhanced wettability and thermal properties of nanofluids and the lubrication effect of the graphene nanoplatelets.

Session Chairs: *Prof. Gamal El-Din Ali Abouelmagd*
Prof. Moustafa Mahmoud Moustafa

10:00 a.m. – 10:15 a.m.

TS10.5 Simulation and Experimental Studies of an X-Y Pneumatic Position Control System Using A Smart Control Algorithm

Amr Abdelmohsen Noureldien, Shehab R. Tawfeic, Magdy A. Bassily*

Minia University

Abstract

This paper deals with the use of a new switching control scheme used to assure good tracking performance of a pneumatic X-Y table. Simulation and experimental studies of an x-y pneumatic positioning control system are introduced using the Approaching Index Switching Algorithm AISA. The value of the approaching index is used to switch between two different control sets. The first set is a lightly damped one used to ensure a faster response of the system, the second control set is a tightly damped one used to approach the final destination. The results obtained using the AISA are compared with those of the Proportional Integral Derivative PID control. The results show much better performance using the AISA compared to those of the PID control. All the desired specifications of the system (error, stability, and power consumption) are robustly satisfied.

Saturday, July 16 (09:00 am – 10:20 am), Room (B)

Session Chairs: *Prof. Mostafa Deep. Hashem*
Prof. Assoc. Prof. Medhat Osman

09:00 a.m. – 09:15 a.m.

TS11.1 Analysing the Impact of Building Envelope on Energy Efficiency in Hot Climates

*Gehad Ahmed**

Architecture Department, Faculty of engineering, Minia University

Abstract

The importance of sustainable buildings has increased in recent years as a result of the need to conserve energy. Buildings utilise most of the energy by about 40% of total energy consumption. The large, exposed area of the building envelope makes it plays a crucial role in achieving energy efficiency and thermal comfort. In hot climates, the building envelope is the barrier that protects the building from the effects of external climate fluctuations and controls the heat exchange between indoor and outdoor environments. This study was concerned with the effect of the main parts of the building envelope such as external wall materials, glazing layers, and insulation materials on the building's energy and thermal performance in hot climates. Many previous related articles were reviewed to inform the designers, at the early design stage, about the optimal envelope configuration compatible with the hot climate. It was found that using the appropriate materials, adjusting the transparency of the glazing, and integrating shading devices, considering the optimal building orientation and window to wall ratio (WWR), can efficiently decrease the total energy usage. the glazing areas have a considerable effect because of their potential to transfer solar gain and control the penetration of natural lighting. By enhancing the thermal transmittance (U-value) and solar heat gain coefficient (SHGC), the thermal properties of the façade materials can be improved. Some new techniques were discussed, including the biomimetic facades or developing an adaptable building envelope that incorporates dynamic responsiveness to changing environmental conditions, in order to identify modern and effective methods.

09:15 a.m. – 09:30 a.m.

تقييم مواد البناء ودورها فى تحقيق الاستدامة وأثر ذلك على تصميم واجهات المبانى TS11.2

محمد حسين عبد العزيز[1]، غادة محمد عبدالعزيز[2]، مهند محمد العجمى[3]*

1. معيد بقسم الهندسة المعمارية كلية الهندسة جامعة المنيا
2. مدرس بقسم الهندسة المعمارية كلية الهندسة جامعة المنيا
3. استاذ بقسم الهندسة المعمارية كلية الهندسة جامعة المنيا

الملخص

يعتبر اختيار مواد البناء هو المكمل لعملية التصميم المعماري وذلك لان اللغة الخاصة بالمادة جزء من الشكل المعمارى واندماجهما معا ويحقق التكامل المطلوب فى العملية التصميمية، فالقدرات التصميمية والخبرة تساعد فى عملية اختيار المادة، لذلك أصبح الشكل المعمارى "الواجهات" مقترنا باختيار مواد البناء المستخدمة، فمواد البناء تخدم الشكل فى المقام الاول ثم التأثير فى الفكرة والمضمون المعمارى فى المقام الثانى.

تمثل المواد أحد عناصر تكنولوجيا البناء التى شهدت تطورا ملحوظا فى القرن العشرين حيث تم استخدام مواد جديدة فى البناء وتطور استخدامها، وتعتبر مواد البناء مؤثرا ظاهرا له اهميته على مستوى الاتزان الادراكى من عدة حوانب هامة كالنسب والاداء الإنشائى والملمس حيث يستخدم شكل المواد ونسبها فى خدمة الحركة "مواد رشيقة كالحديد او مواد تفاعلية كالمواد الذكية."

كما يتصل تأثير المواد مباشرة بديناميكية النظام الانشائى فكلما استخدمت مواد مرنة خفيفة زادت مرونة التشكيل وزاد الارتباط والاستمرار بين عناصر المبنى المختلفة، مما يعطى الفرصة لابتكار تطبيقات متطورة للاتزان الديناميكى.

يهتم هذا البحث بدراسة اهداف العملية التصميمية، وتاثير استخدام مواد البناء على تلك العملية فى شكل الواجهات وكذلك التأثير فى الفكرة والمضمون المعمارى مع وضع تقييم لمعايير الاستدامة لمواد البناء والمواد الذكية شائعة الاستخدام، ودراسة مواد البناء الاكثر انتشارا وتأثيرها فى عملية التصميم المعمارى.

ABSTRACT

The choice of building materials is the complement to the architectural design process, because the language of the material is part of the architectural form and their integration together achieves the desired and required integration in the design process, design capabilities and experience help in the construction process serve the form in the first place and then influence the idea and architectural content in the second place. Materials represent one of the elements of construction technology, which witnessed a remarkable development in the twentieth century, where new materials were used in construction and the development of their use, and the building materials have a clear impact on the level of cognitive balance in several important aspects such as proportions and structural performance and texture, where the shape of materials and their proportions are used in the service of movement as an example of flexible materials such as iron or interactive materials such as smart materials. The impact of materials is directly related to the dynamics of the structural system. the more light flexible materials are used, the more flexible the configuration and the more the connection and continuity between the different elements of the building, which gives the opportunity to invent advanced applications of dynamic balance. Therefore, this research is interested in studying the objectives of the design process and the impact of the use of building materials on that process in the form of facades as well as the impact of this in the idea and architectural content with the development of an assessment of sustainability standards for building materials and smart materials commonly used and the study of the most widespread and influential building materials in the architectural design process of facades.

09:30 a.m. – 09:45 a.m.

TS11.3 Reducing Carbon Emissions by Re-Planning Roads, (The Eastern Road, The Helwan Gate Area, As an Example)

Mostafa M. Radwan[1], Aiman A. Rsheed[2], Mostafa Deep. Hashem[3]*

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Abstract

The highways that connect between cities are usually done during construction of the road path according to the natural terrain of the area in order to reduce the cost and reduce the volume of earthworks and speed of implementation. But with the beginning of attention to the surrounding environment it was necessary to reduce The highways that connect between cities are usually done during construction of the road path according to the natural terrain of the area in order to reduce the cost and reduce the volume of earthworks and speed of implementation. But with the beginning of attention to the surrounding environment it was necessary to reduce carbon emissions in order to reduce global warming and also reduce operating costs for vehicles which uses the road due to the steadily increasing fuel prices.

From here, we started thinking about this research, which re-plans the ways to choose the shortest for implementation, leading to better economies, a clean environment, and reducing the burden on the consumer by reducing transportation costs. In this paper, we will take a piece of the eastern Upper Egypt road and locate it from Heloun Gate with a length of about 12 km, where there is a very severe bend in this area, its shape reaches almost a semi-circle.

The research will be divided into two parts. The first part is concerned with quick calculations of the road before and after the proposed modification and the cost differences between them.

The second part will evaluate the operating economics after the modification based on an algorithmic model. The daily movement rate on this road is calculated, which is equivalent to 1000 Trucks and 1000 passenger cars without exposure to other types of cars, considering the savings resulting from operation and the rate of recovery of additional costs of the road If any. It also reduces carbon emissions automatically. in order to reduce global warming and also reduce operating costs for vehicles which uses the road due to the steadily increasing fuel prices.

From here, we started thinking about this research, which re-plans the ways to choose the shortest for implementation, leading to better economies, a clean environment, and reducing the burden on the consumer by reducing transportation costs.

In this paper, we will take a piece of the eastern Upper Egypt road and locate it from Heloun Gate with a length of about 12 km, where there is a very severe bend in this area, its shape reaches almost a semi-circle.

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09:45 a.m. – 10:00 a.m.

TS11.4 Emphasizing on Prefabrication as A Key to Sustain and Enhance the Technical Heritage of Utilizing Date Palm Midribs in Egypt

E. A. Darwish[1], and Ayman Moustafa[2]*

1. Assistant professor, Architectural Engineering department, Ain Shams University, Cairo, Egypt
2. Assistant professor, Structural Engineering department, Ain Shams University, Cairo, Egypt

Abstract

Prefabrication is an alternative construction method that depends on manufacturing building components offsite in order to achieve time and cost reduction and quality control. This method is limited in Egypt only to caravans and precast concrete housing which constitute a minority of the common construction practice. On contrast, this method is more successfully adopted in the technical heritage of utilizing date palm midribs in handicrafts and construction in rural regions in Egypt, where prefabricated midribs lattices are assembled to make furniture and light huts. Unfortunately, numbers of skilled craftsmen are declining amidst modernization. This paper aims to sustain this technical heritage through emphasizing on employing prefabrication to produce versatile cost-efficient contemporary alternatives to conventional construction methods. Date palm midribs enclosure wall panel is developed to serve as light versatile engineered cladding for light panelised construction, depending on predetermined prefabrication and assembly processes, to maintain safety, time-efficiency and quality control. Finite Element Model analysis of the developed panel, using validated mechanical properties, indicated that the design is safe under own weight and wind load. The developed panel can serve various functions which can help sustain this valuable technical heritage as profitable skills capable of providing local modern competitors to imported products.

Saturday, July 16 (09:00 am – 10:20 am), Room (B)

Session Chairs: *Prof. Mostafa Deep. Hashem*
Prof. Assoc. Prof. Medhat Osman

10:00 a.m. – 10:10 a.m. (Online)

استراتيجية تحقيق التصميم البيئي المستدام باستخدام مواد إنشائية بديلة TS11.5

ريهام حمدي*

قسم الهندسة المعمارية - معهد المستقبل العالي للهندسة - الفيوم

الملخص

تشـــهد البلاد حاليا انطلاقة تنموية عمرانية جديدة تهدف لمواكبة التطور العالمي و النهوض بمصـــر و تأكيد مكانتها بين دول العالم . و تزامن ذلك مع مواجهة العديد من التحديات العالمية متبلورة في المشـكلة الاقتصـــادية العالمية التي تتفاقم يوما بعد الاخر – نتيجة العديد من الاحداث السـياسـية العالمية – بالإضـافة إلى جائحة كورونا وما سـببته من ضرر اقتصادي . كل ذلك تواكب مع مجموعة من التحديات على المستوى المحلي والمتمثلة في الزيادة السكانية المطردة و محدودية موارد التمويل بالاضافة الى مشكلة ارتفاع أسعا ر مواد البناء و استهلاك قدر كبير من الطاقة من خلال نظم الانشاء التقليدية سواء أثناء التصنيع أو خلال فترة تشغيل المنشأ.
لذا كان لا بد من إيجاد بدائل مستدامة للأنظمة والمواد والتي تكون متوافقة بيئيا و اقتصاديا و اجتماعيا لضمان كفاءة اداء مميزة للمبنى طوال فترة الاستخدام . و ذلك تأكيدا على مبدأ العمارة الايكولوجية Ecological Architecture و التي تركز على اقتصـــادية المبنى مع كفاءة إدارة وتنظيم مصـــادر الطاقة و الموارد المحلية المتاحة لتحقيق وظائف المباني و توفير بيئة داخلية مريحة و فعالة.

وانطلاقا من المقولة المشـهورة " ابن على أرضـك من أرضـك " فإن " الطوب الرملي المضـغوط " أو ما يطلق عليه " طوب الليجو " يعتبر من أهم المواد الإنشـــائية البديلة التي تحقق المعادلة الصـــعبة المتمثلة في اســـتغلال الموارد المتاحة و تقليل التكلفة الإجمالية للمبنى و صـديق للبيئة بالإضـافة إلى تقليل معدلات استهلاك الطاقة بالإضـافة إلى تحقيق الراحة الحرارية داخل الفراغات ، مما جعله من أفضل أساليب الانشاء التي تحقق الاستدامة و خاصة في تنمية المناطق الصحراوية

وقد تبنى المركز القومي لبحوث البناء تلك التقنية وتم الانتهاء من الكود الخاص بالانشـــاء بنظام التربة المثبتة و صدور النسخة الأولى – التجريبية- عام 2015 ، و التي تم تداولها و اعتمادها بشكل رسمي عام 2018
رغم ذلك لم يتم استخدامه على نطاق واسع و لم يستغل من خلال مشروعات التنمية السكنية – خاصة للقرى المصرية – التي لا تتطلب الارتفاعات الشاهقة أو البحور الكبيرة في الفراغات الداخلية.

Saturday, July 16 (09:00 am – 10:20 am), Room (B)

Session Chairs: *Prof. Mostafa Deep. Hashem*
Prof. Assoc. Prof. Medhat Osman

10:10 a.m. – 10:20 a.m. (Online)

TS11.6 تطوير الفراغات العمرانية المركزية (الميادين) بين العالمية والمحلية – دراسة تحليلية

منة الله على عباس[1]، شيماء محمد حمدى[2]، مهند محمد العجمى[3]*

1. معيدة بقسم الهندسة المعمارية، المعهد العالى للهندسة بالمنيا
2. مدرس بقسم الهندسة المعمارية، كلية الهندسة، جامعة المنيا
3. استاذ بقسم الهندسة المعمارية، كلية الهندسة، جامعة المنيا

الملخص

يدرس البحث الفراغات العمرانية المركزية ومنها الميادين الرئيسيه بالمدن الكبرى، من خلال إستعراض مواصفات الفراغات العمرانية المركزية والتعرف على الإستراتيجيات اللازمة لاستعادة دور الفراغات العمرانية المركزية بما يلبي الاحتياجات الإنسانية، وذلك من خلال دراسة المعايير العمرانيه وغير العمرانيه (اجتماعيه – جماليه – تاريخيه – اقتصادية – بيئية) في تصميم الميادين، وبالبحث تم استعراض بعض التجارب العالمية والمحلية في تصميم وتطوير الميادين (ميدان ويلينجتون بشرق مدينة بيرث بأستراليا الغربية - ميدان سينتينيال بمدينة فيكتوريا بكولومبيا بكندا – ميدان محطة مصر بالاسكندريه)، وذلك لعمل دراسة تحليلية مقارنه لتقييم الإيجابيات والسلبيات لمشروعات التطوير ودورها في تحقيق الاحتياجات السكانية المستهدفة من الفراغات.

وتوصل البحث إلى العوامل العمرانية وغير العمرانية المؤثرة في تحقيق المتطلبات الإنسانية بمشروعات التطوير طبقاً للامكانيات المتاحة، وذلك من خلال الوعي بمشكلات الميادين طبقا للظروف العمرانيه والاجتماعيه والبيئية والحركية والاقتصادية، ويوصي البحث بضرورة تكامل عمليات التطوير العمرانى للميادين لجميع الجوانب العمرانية وغير العمرانية بمشاركة جميع القطاعات والسكان وتنمية الوعي الفكري والحضاري بأهمية مشروعات التنمية المستدامة للفراغات العمرانية المركزية القائمة بالمدن وتوضيح دورها في تحسين الصورة البصرية للمدينة

Session Chairs: *Prof. Hassan Shokry*
Prof. Rabeay Y. A. Hassan

09:00 a.m. – 09:15 a.m.

TS12.1 Production of Different Carbon Contents Materials from High-Density Polyethylene Waste

Hassan Shokry[1], Eslam Salama[2], and Marwa Elkady[3]*

1. Environmental Engineering Department, Egypt-Japan University of Science and Technology, New Borg El-Arab City, Alexandria, Egypt
2. Environment and Natural Materials Research Institute (ENMRI), City of Scientific Research and Technological Applications (SRTA-City), New Borg El-Arab City, Alexandria 21934, Egypt
3. Chemical and Petrochemical Engineering Department, Egypt-Japan University of Science and Technology, New Borg El-Arab City, Alexandria, Egypt

Abstract

This work presents the conversion of high-density polyethylene (HDPE) waste plastics into valuable carbon materials via thermochemical treatment under autogenic pressure. Thermal decomposition of HDPE was carried out from 500 °C to 1000 °C in an enclosed stainless-steel autoclave. The char products were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), Energy-disperse X-ray analysis (EDX) and surface area and pore analysis. The effect of temperature on the yield and properties of the char products has been thoroughly discussed using the various analytic methods. Different carbon products including graphene, carbon microspheres (CMS) and carbon nanotubes (CNT) were synthesized depending on the decomposition temperature. Such carbon products from each decomposition temperature have unique characteristics suitable for several applications.

Session Chairs: *Prof. Hassan Shokry*
Prof. Rabeay Y. A. Hassan

09:15 a.m. – 09:30 a.m.

TS12.2 Minimization Moles of Carbon in Silicon Production by Carbothermal Reduction of Silica

A. M. Abdelhafiz, A. A. Abouelsoud, Reda AboBeah, and Ibrahim Ashour*

faculty of engineering Minia university

Abstract

Silicon metal is important metal produced by carbothermal reduction of SiO2 at high temperatures between 1600℃ to 3000℃ in an electrical arc furnace (EAR). Silicon is used in many life applications such as electronic chips, solar cells, and medical devices.

In this paper, the focus was on the effect of moles of carbon and silicon carbide ratios to reduce the amount of Carbon monoxide (CO) production without affecting the productivity of silicon. Carbon monoxide is one of the gases harmful to the environment, so care must be taken to eliminate or reduce it.

Through a simulation in MATLAB® was found that an increase in carbon moles leads to an increase in the productivity of carbon monoxide.

9 moles of carbon can be replaced by 1 mole of silicon carbide to obtain half the yield of carbon monoxide and to maintain the yield of silicon, at a temperature of 2200K.

Session Chairs: *Prof. Hassan Shokry*
Prof. Rabeay Y. A. Hassan

09:30 a.m. – 09:45 a.m.

TS12.3 Designing and Engineering of Electrochemical Biosensors for Environmental Pollutants Analysis

*Rabeay Y. A. Hassan**

Zewail City of Science and Technology

Abstract

Environmental pollution has been considered as the most important global problem. Air, soil and water pollution are the main types which are caused by various emerging pollutants. Thus, modern techniques for environmental analysis are needed to provide the rapid tracking of toxic and environmental hazards. Here, various types of electrochemical biosensors have been designed and optimized for ultra-trace detection of microbes, pesticide or heavy metal residues in environmental samples. Basically, the biosensors operate through the detection of specific target(s) with subsequent conversions of the obtained signals into proportional signals for further analysis. A fully functional biosensor is composed of a recognition element(s), transducers (electrochemical, optical calorimetric and mass change), and an electronic system (including a signal amplifier, processor and data display). The use of nanomaterials as sensor platforms increased the biosensors performance. Therefore, the principles of biosensor construction, effect of nanomaterials and the environmental analysis will be presented and discussed.

Session Chairs: *Prof. Hassan Shokry*
Prof. Rabeay Y. A. Hassan

9:45 a.m. – 10:00 a.m.

TS12.4 Green Synthesis of Isopropyl Myristate Using Immobilized Candida Antarctica Lipase: Process Optimization Using Response Surface Methodology

M. Shaaban Sadek[1], N.A. Mostafa[1], and Ahmad Mustafa[2,3]*

1. Chemical Engineering Department, Faculty of Engineering, Minia University, Minia, Egypt
2. Faculty of Engineering, October University for Modern Sciences and Arts (MSA), Egypt
3. Center of Excellence, October University for Modern Sciences and Arts (MSA), Egypt

Abstract

This work aims to produce isopropyl myristate (IPM), a common emollient ester in a solvent-free system. An esterification reaction between isopropyl alcohol (IPA) and myristic acid (MA) was performed in a closed batch reactor using immobilized Candida Antarctica lipase as a biocatalyst. Reaction conditions were optimized using response surface methodology based on a five-level, three-variable composite design. The interactive effects of conditions on the IPM yield were investigated in the following ranges: IPA-to-MA molar ratio of 2:1–8:1, 1%–4% (w/w) Novozym 435, and 1%–10% (w/w) molecular sieves. The optimum conditions were IPA-to-MA molar ratio of 8:1, 4% w/w of Novozym 435, and 10% w/w of molecular sieves at 60°C and 150 RPM for 2.5 h. The maximum experimental and predicted conversion values were 90.00% and 90.92%, respectively. Moreover, Novozym 435 exhibited remarkable operational stability because it was used for 15 cycles without considerably losing its original activity. In studying the feasibility of the proposed method, a process flow diagram was suggested to perform the semicontinuous production of IPM in a solvent-free medium.

Session Chairs: ***Prof. Hassan Shokry***
Prof. Rabeay Y. A. Hassan

10:00 a.m. – 010:10 a.m. (Online)

TS12.5 Electrocoagulation as an Efficient Technique to Remove Dyestuffs from Aqueous Mediums

O.A. Fadali[1], M.M. Nassar[1], T.E. Farrag[2], and A.A.M. Ibrahim[3]*

1. Chemical Engineering Department, Faculty of Engineering, Minia University, Minia, Egypt.
2. Chemical Engineering Department, Faculty of Engineering, Port Said University, Port Said, Egypt.
3. Chemical Engineering Department, Canal High Institute of Engineering &Technology, El-Suez, Egypt.

Abstract

In recent years, attention has been directed towards the application of electrocoagulation (EC) for treatment of wastewater contains toxic and non-biodegradable organic pollutants. It has flexibility in design, operation and the cost. In our study, EC was adopted to treat a lab-synthetic wastewater polluted by methylene blue dye in a batch cell of iron screen anode and two iron cathodes, inner rod and outer cylindrical sheet. The effects of current density, electrolyte concentration and the initial concentration of pollutant on process performance and energy consumption were investigated for a definite process time. The results showed that process efficiency has a direct proportional with applied current density and electrolyte concentration in contrast with the initial concentration of pollutant. Furthermore, for 300 ppm initial dye concentration and 16 g/L NaCl, removal efficiency reached 93% for current density of 2.67A/m2 compared with 71% at 0.77A/m2 during 15 min process time while 99.5% removal was achieved after 25 min for 2.67A/m2 current density when other parameters remain constant. The optimum operating conditions is calculated from economic point of view based on the requested characteristics of treated water.

Session Chairs: ***Prof. Hassan Shokry***
Prof. Rabeay Y. A. Hassan

10:10 a.m. – 10:20 a.m. (Online)

TS12.6 Nanocelluloce Preparation, Characterization and Production

*Mahmoud Abdel Goad and Amany F. Abdelfattah**

Faculty of Engineering, Minia University, Egypt,

Abstract

Biomass refers to any organic material that is derived from plants or animals that are existing in our planet. Cellulose, which is delivered from biomass, in nano-sized particles is known as Nanocellulose. It is a promising potential biomaterial, that is of importance for a range of applications in pharmaceutical and biomedical fields. The experimental-setup procedures and equipment for producing Nanocelulose in lab-scale were performed. The obtained Nanocelluloce was characterized by analytical methods. Scanning electron microscope, X-ray diffraction and Fourier-transform infrared spectroscopy were performed to evaluate Nanocellulose. Programming a software enables developers to develop, write, test and debug other software programs. A software for Nanocellulose production design is presented in this research. The software was coded for scaling up for the production in pilot-scale and determining quantities of reactants with regard to production rate of Nanocellulose. We investigated the materials and procedures used in the manufacturing of Nanocellulose on a lab scale before increasing the amount of these materials. It is required to enter the production rate and the condition experimental conditions which are acid concentration and temperature of reaction applied in hydrolysis.

Session Chairs: ***Prof. Hassan Shokry***
Prof. Rabeay Y. A. Hassan

10:20 a.m. – 10:30 a.m. (Online)

TS12.7 Black Liquor Waste Produced from Bagasse Kraft Pulping as an Admixture in Concrete

Mammdouh M. Nassar[1], Taha E. Farrage[2] and Hamdy A. Mohamed[3]*

1. Chemical Engineering Department, Faculty of Engineering, Minia University, Minia, Egypt.
2. Chemical Engineering Department, Faculty of Engineering, Port Said University, Port Said, Egypt.
3. Qena Paper Industry Company, Qena, Egypt

Abstract

The black liquor (BL) that obtained as a by-product of paper manufacturing process after digestion step, where the cellulose fibers have been removed from the bagasse, is one of such material that can be used as a chemical admixture. Around 4 million tons of kraft bagasse black liquor (TDS= 6:8%) is obtained in Egypt each year from pulping mills. The discharge of black liquor to water resources causes serious of environmental issues in contrast with adding it to concrete as an admixture has a positive impact on environment beside economy. Adding of BL to concrete improves its properties such as workability, compressive strength and setting time (initial and final). In this study BL is added to fresh concrete in different dosages (0, 1, 2, 3, 4%), the concrete is then tested for workability (slump test), compressive strength, apparent porosity, bulk density and setting time. The results show that both compressive and tensile strength increased up to certain percentage of pulp black liquor. The initial and final setting times were increased by adding black liquor, so it can be used as a retarder. Adding of 2% wt. of liquor is the optimum value that gives maximum improved results. These results open the door for utilization of black liquor from Qena Paper Industry Company, Quse, Egypt as an admixture to improve concrete properties.

06:30 p.m. – 06:40 p.m.

OTS01.1 Modeling and Parameters Estimation of a Self-Balancing Two-Wheeled Vehicle

Muhammad Ahmed Essam Hassan, Ahmed Mahmoud Moustafa, Mohammed Moness*

Faculty of Engineering Minia University

Abstract

The self-balancing two-wheeled vehicle is a practical realization of the well-established control benchmark of the inverted pendulum system. Despite the sophisticated dynamics and kinematics of the inverted pendulum system, it has acquired great interest in real-life applications starting from Segway and hoverboards to the self-balancing wheelchair. These applications benefit from the dynamical structure that provides high maneuverability within narrow spaces. However, the system complexity regarding the high-nonlinearity and instability requires accurate models for model-based control of the balancing and motion planning control objectives. This work addresses the modeling and the parameters estimation of a lab-scale version of the self-balancing two-wheeled vehicle. First, a nonlinear dynamical model based on LaGrange kinematics is developed. Then, real-time datasets for closed-loop operations is acquired for offline optimization. Finally, an optimization problem is formulated and solved for the parameters estimation through a decoupled block-by-block approach. The obtained grey-box model is validated for reliable and accurate fitting of the real system.

06:40 p.m. – 06:50 p.m.

OTS01.2 Speed Sensorless of Linear Induction Machines Based on Model Predictive Current Control Without Weighting Factors in Urban Transit

Samir A. Hamad, Ramadan M. Mostafa, Jean Thomas, E. G. Shehata, Ahmed Diab*

1-Process Control Technology Dept., Faculty of Technology and Education, Beni-Suef University, Beni-Suef, Egypt.
2-Electrical Engineering Dept., Faculty of Engineering, Beni-Suef University, Beni-Suef, Egypt.
3-Electrical Engineering Dept., Faculty of Engineering, Minia University, El Minia, Egypt.

Abstract

There is an increasing interest in achieving global goals of climate changes which target environment protection. Thus, electric vehicles (as linear metros) were elaborated to avoid greenhouse gas emissions which negatively impact climate. Hence, in this paper, a finite control set-model predictive current control (FCS-MPCC) method of linear induction machine (LIM) was proposed for linear metro drives to achieve lower thrust ripples and eliminate selection of weighting factor (WF), the main limitation of conventional finite control set-model predictive thrust control (FCS-MPTC). Also, model reference adaptive system was used for speed estimation due to some environmental considerations and also for being cost effective. The proposed method used a single cost function that avoided the existence of WF and consisted of primary current errors between the predicted values and their references in αβ-axis. A comparison between the FCS-MPTC and the suggested control method was conducted using Matlab/Simulink under a wide range of operating circumstances along with uncertainty validations cases, on the basis of one 3 kW arc induction machine (which constructed to imitate the actual behavior of the LIM). The extensive simulation results revealed that the proposed FCS-MPCC method can lead to much lower thrust ripples without heavy calculation steps.

06:50 p.m. – 07:00 p.m.

OTS01.3 Flexible Alternate Optimization for SDM Parameters Estimation of PV Solar Cells.

Husain A. Ismail[1], Ahmed A. Zaki Diab[2].*

1. Bilbeis Higher Institute for Engineering, Sharkia, Egypt.
2. Faculty of Engineering, Minia University, Egypt.

Abstract

The photovoltaic (PV) module is vital for clean power production using solar cells. Designing the PV modules depends on accurately estimating the parameters that model the PV modules. The common model that is used to represent the PV module is known as the single diode model (SDM), which contains five unknown parameters. This paper proposes a novel parameter estimation algorithm to estimate the SDM parameters, referred to as flexible alternate optimization (FAO). The proposed FAO algorithm is based on a discrete search approach that performs an exhaustive search for a small set of the estimated parameters (called the decision set) while the rest of the parameters are kept fixed at specific values. The number of parameters in the decision set flexibly controls the trade-off between algorithm complexity and parameter estimation accuracy. Actual RTC France solar cell measurements are used to assess the proposed FAO algorithm compared to the literature algorithms. It is shown that the proposed FAO algorithm provides the best estimation accuracy, most robust, and less execution time when compared to the algorithms in the literature.

07:00 p.m. – 07:10 p.m.

OTS01.4 Solar Tracking System of Photovoltaic Panels Based on Advanced Control Techniques

Basant Mahmoud[1], A. A. M. Hassan[1], Magda Elfoly[2], Ahmed A. Zaki Diab[3]*

1. Mechanical Power Department, Faculty of Engineering, Minia University, Egypt
2. Dept. of Mechatronics Engineering, Minia High Institute of Engineering and Technology, Egypt 3. Electrical Engineering Department, Faculty of Engineering, Minia University, Egypt

Abstract

In this paper, a numerical examination, control framework, and Simulink demonstration have been created, planned, and tried using the MATLAB/Simulink to observe a photovoltaic module that uses sun-powered vitality in arrangement to realize its ideal operational productivity. The information used in the planned framework has been extracted from the arrangement of conditions' administration framework, which depicts the sun's movement from dawn to dusk. The ideal execution of the planned framework can be achieved when the break-even point equals zero during sunlight, which will maximize the sun-based vitality produced by the framework. The results obtained show the ease, accuracy, and appropriateness of the displayed outlined controller in meeting all operational requirements. Also, the proposed framework can be used for both instructive and investigation purposes.

07:10 p.m. – 07:20 p.m.

OTS01.5 Considering Dust Accumulation on PV for Sizing PV/Wind/Battery Energy System Based on Weather Data

Mahmoud Aref, Safaa Saleh, Mohammed Nayel*

Department of Electrical Engineering, faculty of engineering, Assiut University, Egypt

Abstract

Photovoltaic systems are the most effective alternative renewable energy source for isolated areas. But PV output power is affected by environmental factors such as temperature and dust accumulation on it. Periodically cleaning of PV panels increase converted solar energy. Isolated areas in Egypt do not have a connection to the electricity grid due to the high cost of transmission lines extension. Using conventional sources is not practical, as they cause emission gases. Moreover, they are limited sources. Renewable sources become essential power suppliers for isolated areas, as they are clean and unlimited sources. Moreover, 50% of energy demand for Egypt was foreseen to be met by renewable sources in 2030. This paper introduces an optimal sizing for a stand-alone hybrid energy system (PV/Wind/Battery) considering the dust effect on PV with different cleaning scenarios at tilt angle 30 for PV, supplying electrical energy needs for an isolated area in Egypt (shalateen city). The optimal sizing is obtained using HOMER software for five cleaning scenarios for PV. The effect of dust accumulation on PV based on weather data are estimated. A previous literature measured data in Egypt are used to get a regression model for power reduction. The regression model is checked with measured data in another site in Egypt. Good agreements are obtained from the regression model, so this model is used to get the power reduction in shalateen city. The results from this model are used in HOMER software to get the optimal solution for the system. the results show that the optimal solution is the (PV+wind+battery) system with a weakly cleaning scenario with 15053kW PV, 797 wind turbine, 1187 battery, and 6895 kW converter. The net present cost (NPC) and the cost of energy (COE) for the optimal system are 103M$ and 0.319$/kWh respectively. When using only PV source for supplying the system, the optimal system is (PV+battery) also with weakly cleaning scenario with 117M$ NPC and 0.363$/kWh. From the previous results using hybrid energy systems in isolated areas in Egypt is more economic compared to a single system source.

07:20 p.m. – 07:30 p.m.

OTS01.6 Hybrid AC/DC Sources Integration Using Power Electronics-Based Transformer

*MAzen abdel salam, Mohamed abdelazim nayel, Mohsn Badr, Mohamed Mahmoud Hassan**

Assiut University (Egypt), University of Toronto (Canada)

Abstract

In the presence of DC/AC loads, an integrated hybrid DC/AC microgrid offers a wide range of operational capabilities; yet, it suffers from the presence of many dc loads and dc generations. Recent research trends in power electronic interfaces for renewable and distributed energy sources have emphasised cost, size, and weight reduction, as well as improved power quality and efficiency. Recent efforts have been made to replace traditional power transformers with superior power electronics-based Solid-State Transformers (SST). SST has numerous benefits, including reactive power correction, smooth voltage conversion, active power transfer, and so on. The use of SST as a hybrid energy source interface for house-load grid-connected systems is proposed in this research. This work also considers the application and analysis of SST as a replacement for traditional energy system interfaces with either residential or commercial loads. The proposed system is made up of a solar PV module, a wind turbine, an SST with dual active bridges (DAB), and an inverter. The performance of the configured system is evaluated under various power management scenarios using the MATLAB/Simulink software platform. The results show that the SST-based converter system can integrate efficiently both wind turbines and solar PV modules into the grid. By reducing transformer size and cost and utilizing current pulse shaping to dictate power transfer characteristics and direction, the transformer and SST efficiently deliver cost savings and more avenues of control to a high-power converter. Depending on the relative phase angle between each Active Bridge switching, the SST with dual active bridge improves efficiency and power transfer.

07:30 p.m. – 07:40 p.m.

OTS01.7 Predicting DNA Methylation state of CpG Islands Using Machine Learning

Asmaa Abo Bakr Kamel[1], Esraa M. Hashem[2]*, Mai S. Mabrouk[3]

1. College of Computing and Information Technology (CCIT), Arab Academy for Science Technology and Maritime Transport (AASTMT) Cairo, Egypt
2. Biomedical Engineering Department, Misr University for Science and Technology (MUST University), 6th of October, Egypt
3. Biomedical Engineering Department, Misr University for Science and Technology (MUST University), 6th of October, Egypt

Abstract

Background: DNA methylation is the primary and best understood epigenetic element that controls human health. It is an essential regulator of gene transcription. Methylation may be the head of some diseases like Parkinson's, cardiovascular, chronic kidney, cancer, post-traumatic stress disorder, and Alzheimer's. DNA methylation occurs mainly at cytosine, followed by guanine known as CpG loci leading to gene control or diseases. The implementation of models to predict DNA methylation has been concentrated by researchers in the bioinformatics area, according to the difficulties of predicting the methylation that is very sensitive to lifestyle or pollution changes. Recent improvements in methylation sequencing way permit the recognition of genome-wide methylated sites in DNA. Results: In the represented work, computational methods are used to predict the methylation of DNA for every CpG locus and non-CpG locus in the whole genome, predicting methylation for every CpG locus accurately, utilizing Illumina 450K array data within the 250bp region around every CpG site of the human embryonic stem cell with three classifiers including logistic regression, support vector machine, and random forest. The classifiers were trained on the cell line H1 of the human embryonic stem cell. In contrast, they were tested on the cell line H9 of the human embryonic stem cell. Conclusion: The proposed classifiers have been evaluated by measuring their performance based on error rate, accuracy, prevalence, sensitivity, and specificity. Results show that the best performance criteria came from the random forest approach giving an accuracy of 99.9% for a methylation status compared to the other two classifiers. Expressing more features will lead to higher prediction performance and wider detection coverage for methylation of CpG loci.

06:30 p.m. – 06:40 p.m.

OTS02.1 Development of an Enhanced Car Safety System

Ossama adel saad morsy, Ali Gamal Hafez, Hesham Fathy Hamed*

Nahda University, Faculty of Engineering Minia University, Faculty of Engineering

Abstract

The presented report revolves around a system to increase safety while driving a car according to the huge increase in the number of road accidents in the world, especially in Egypt, due to the driver's lack of focus on the car while driving as a result of feeling drowsy or distracted while driving, which increases the process of an accident as a result of the error of the human element in Follow the road instructions and lead to an accident. We started working on a chip that predicts whether the driver feels drowsy or distracted while driving, which increases the process of an accident as a result of human error by reading eye signals, which are EOG waves, through electrodes attached to the driver's head and measuring the signals that come out of the driver's eye Which give us an idea of how focused the driver is during the driving process.

06:40 p.m. – 06:50 p.m.

OTS02.2 A Genetic Optimization Algorithm for Self-Driving Vehicles Based on Automated Behavior Cloning Convolutional Neural Network

Ahmed Abd El Moaty Mohamed Gouda, kamel Hussien Abd Elrazek, Ahmed Abd El-Baset Donkol*

nahda university, Minia university, nahda university

Abstract

Autonomous driving technology recently learned to drive safely and smoothly. Nonetheless, Using Convolutional Neural Networks (CNNs), the performance of CNNs is significantly influenced by their designs. Most current CNN designs are built manually by specialists in both CNNs and the investigated topics. In other words, finding the optimum CNN designs for learning safe driving behavior is complex. This study uses genetic algorithms to construct Automated Genetic Behavior Cloning (AGBC). The proposed algorithm's " Automated " features need little knowledge of CNNs. Using a front-facing camera and an experienced driver's steering directions, the researchers can still acquire a strong CNNs architecture for learning safe driving behavior. It might be used to teach the AGBC to emulate human driving behavior. Comparing the suggested technique against one Manually Adjustment Behavior Cloning CNNs (MABC), four Automated Genetic Manually Adjustment Behavior Cloning CNNs (AGMABC), and four AGBC architecture design methods validate its effectiveness and robustness. Studies show that this method outperforms existing AGBC architecture design techniques regarding classification accuracy, parameter numbers, and computing resources. The suggested method uses less computational resources than MABC and AGMABC.

06:50 p.m. – 07:00 p.m.

OTS02.3 Carbon Footprint Study on Renewable Power Plants: a Case Study of Egypt-Benban Solar Park

Mostafa Metwally[1], Gaber Magdy[2], Adel A. Elbaset[1,3], and Esam Zaki4*

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4. Computer Department, Faculty of Engineering, Modern Academy of Engineering & Technology, Cairo, Egypt.

Abstract

Some recent human activities have negatively affected the environment through the production of toxic substances. Carbon footprint refers to the total amount of greenhouse gases generated, i.e., disaggregated by categories of equivalent carbon dioxide compounds. It plays a major role in global environmental degradation, causing global warming. The direct emission of the carbon footprint is determined by the fossil fuels used to generate electricity traditionally and our use of different means of transportation (cars, trains, and planes). The use of renewable energy sources is a long-term investment aimed at obtaining clean energy, reducing carbon footprint, and replacing fossil fuels for electricity production, thus contributing to the conservation of energy resources for future generations. This paper discusses the most important ways to reduce the carbon footprint by treating toxic gases in the atmosphere and switching to the use of renewable energies such as solar energy. The results obtained show that the more we use renewable energy, the less carbon it is because it is clean energy. Furthermore, we have studied the case of the Benban solar power plant located near Aswan city in Upper Egypt which is considered one of the world's biggest solar photovoltaic stations. It was found that this renewable power plant reduces carbon emissions by 2 million tons of heat emissions, the equivalent of 400,000 cars.

07:00 p.m. – 07:10 p.m.

OTS02.4 Mitigation of Harmonic Emissions of Distributed Energy Resources [Ders] in the Existence of Nonlinear Connected Loads

E. Radi, M. Mandor

Faculty of Engineering at Shoubra, Benha University Cairo, Egypt

Abstract

The impact of interconnected distributed energy resources -employing different generation technologies- on the power quality is a major concern for typical utility distribution engineers, most of whom are very conservative in their approach to planning and operations. Power quality Issues affected by [DERs] include voltage regulation, sustained interruptions, harmonics and voltage sags. Harmonics can lead to equipment failure to operate properly, while in other cases, equipment may suffer premature failure (aging acceleration factor). This paper investigates harmonics generation from interconnected photovoltaic arrays and fixed speed wind turbines and its propagation effects locally at the point of common coupling (PCC) as well as at all the other system buses in the existence of nonlinear loads which will be applied to the IEEE 5-bus test system. Based on the obtained results, a passive filter will be designed for proper harmonics mitigation.

07:10 p.m. – 07:20 p.m.

OTS02.5 Simulation of Mine Fires and Their Effect on Ventilation System

Mohamed Ali, and Mohamed Elwageeh

Cairo University- Faculty of Engineering

Abstract

The most feared hazards in underground mines or other subsurface facilities are those of fires and explosions. These do not occur often, but when they do, they have the potential to cause disastrous loss of life and property as well as temporary or permanent sterilization of minerals. Fires in an underground mine environment can quickly begin to govern the behavior of airflows in the immediate vicinity of the fire through reversing and recirculation of the air currents.

The basic objective of the present study is to establish a fire ventilation simulator for underground mines that can be used to develop emergency ventilation systems, analyse the strengths and shortcomings of various types of emergency ventilation methods, and determine the most effective ventilation method to minimize injury to people and property.

The fire simulator developed in this thesis consists of four modules: a network analysis module for predicting the airflows in regular cases and after the outbreak of a fire; a temperature distribution module; a pressure imbalance resulting from the fire heat energy module; and a contaminant fire gas concentration spread module. The developed fire simulator (Fire-Sim) has been successfully used to model hypothetical fire outbreak scenarios in The Maghara coal mine as a case study. The results verify the validity and applicability of the simulator and can provide reference for the evacuation and rescue of underground mines fire accident.

07:20 p.m. – 07:30 p.m.

OTS02.6 An Authentic-based Privacy Preservation System for Smart E-Healthcare Systems Based on Zero Run Length Encoding and DNA Cryptography

Mona Elamir[1], Mai S. Mabrouk[2], Walid I. Al-atabany1[3]*

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2. Biomedical Engineering Department, Misr University for Science and Technology, Egypt
3. Information Technology and Computer Science School, Nile University, Egypt

Abstract

Information security involves protecting such sensitive information from unauthorized access which includes inspection, modification, recording, and any disruption or destruction. That's why important strategic resources and large corporations ensure the safety and privacy of critical data such as customer account details, financial data, or intellectual property. To make sure that the information reaches the intended persons usually the sender and the receiver, all the weaknesses of security systems must be supported by creating novel algorithms based on recent secure technologies like DNA cryptography. This study aimed to propose a crypto-compression system based on a hybridization of data compression and data encryption technique using zero-Run-Length Encoding (zRLE) and DNA cryptography technique. Such a proposed system reconstructed the compressed data with similarity percent 100 and zero mean square error by performing lossless compression for data to increase transmission speed.

07:30 p.m. – 07:40 p.m.

OTS02.7 Energy Conservation in Elevators in High-Rise Buildings

Mohamed A.A Mostafa Aziz, Mohamed Ahmed El-Mesiri, Ghada Mohamed Amer, Tamer Mohamed El-Saied El-khoudragy*

Faculty of Engineering, Benha University, Egypt

Abstract

Elevators are critical to the operation and functionality of high-rise buildings and other facilities in urban centers such as the new administration capital city, new Cairo. Elevators account for approximately 4% of the electricity consumed in residential buildings. These transportation systems account for a sizable portion of electrical power demand and building energy consumption. However, data on their energy performance and energy conservation strategies are scarce. Often, energy is lost in idle and standby modes. The purpose of this research is to investigate the fundamentals and features of energy consumption in elevator situations (idle, standby, and operating) in order to evaluate potential approaches for controlling and reducing standby power consumption. Relevant research and technical standards have been analyzed to discover data that may be used to determine standby power. Standby power consumption is reported to account for up to 80% of total energy spent each year, depending on traffic demand, operation characteristics, control methods, and motor technology. The paper attempts to propose a model that will assist in reducing elevator energy usage in three scenarios (idle, standby and operation). Additionally, motor drive technology and intelligent controls offer significant possibilities for energy savings .

06:30 p.m. – 06:40 p.m.

OTS03.1 Design of A Simple Scada System for Water Distribution Stations and Companies

Kamel Hussein Rahouma and Walaa Ibrahim Khalid*

Electrical Engineering Department, Faculty of Engineering Minia University, Minia, Egypt

Abstract

Water management problems has resulted in a need to accurately measure the amount of delivered water from the product water-station to the citizen houses, especially in the remote poor areas, where the water networks are not available. There must be an accurate monitoring system for the quantities of water consumed in these areas to achieve a policy of equitable distribution. This paper aims to design a simple system, in which, an operator (with no experience) can run and use it by entering the required water quantity from a keypad and then starting the flow process. The system will calculate the water flow by a flow meter such that when the required quantity of water is reached, the water flow stops. The system computes the price and sends the quantity of water and the corresponding price to an LCD display and a storage medium. Such information would be available for simulation and reports. The proposed system makes use of an AVR ATmiga2560 arduino microcontroller, a keypad, an LCD and an internal memory. Economically, the proposed system is very cheap and effective. It can replace the SCADA systems which cost much and it also does not need any training for use.

06:40 p.m. – 06:50 p.m.

OTS03.2 An efficient Automatic Speaker Identification System Based on Pitch Frequency Estimation in Degraded Environmental Conditions

Amira Shafik[1,2], Ashraf A. M.[2], EL-Sayed M. El-Rabaie[1], Fathi E. Abd El-Samie[1,3]*

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Abstract

In this paper, we investigate the utilization of the Normalized Pitch Frequency (NPF) as an extracted feature from speech signals to be combined with the Mel Frequency Cepstral Coefficients (MFCCs) and polynomial coefficients. The objective is to compose more robust feature vectors to various forms of degradation such as Additive White Gaussian Noise (AWGN) and music interference. A matching process is performed to determine the identity of the unknown speaker, using a trained Artificial Neural Network (ANN) as a classifier. An Automatic Speaker Identification (ASI) system is presented in this paper including pre-processing methods based on Discrete Transforms (DTs) such as the Discrete Cosine Transform (DCT), the Discrete Sine Transform (DST) and the Discrete Wavelet Transform (DWT) for presenting robust features. Speech enhancement techniques such as Spectral Subtraction (SS), Wiener filtering, adaptive Wiener filtering, and wavelet de-noising are investigated to mitigate the impact of noise and improve the efficiency of the ASI system. Simulation results demonstrate that the utilization of the NPF with MFCCs as features extracted from both the speech signals and the DCTs of these signals increases the ASI system accuracy in the presence of noise and interference. The wavelet de-noising enhances the proposed system effectiveness and gives high recognition rates even with very low Signal-to-Noise Ratios (SNRs).

06:50 p.m. – 07:00 p.m.

OTS03.3 Manipulation of Electromagnetic Waves Via Graphene-Based Coding Metamaterials for Terahertz Applications

Ahmed A. Hassan, Ahmed S. Elkorany, Adel A. Saleeb, El-Sayed M. El-Rabie*

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Abstract

Graphene has the great advantage that its conductivity can be controlled via an electric bias. A unit cell was constructed using graphene that gives a reflection phase of 0 or π according to the bias. A coding metamaterial was constructed as a square matrix of 8x8 unit cells. A plane wave incident normally on the coding metamaterial scattered and formed two main beams. The beamwidth and direction of propagation of the two beams depend upon the arrangement of the unit cells. The unit cells can be arranged as 1x1, which means one column gives zero reflection phase and the next column gives π phase. Arrangements 1x1, 2x2, and 4x4 were studied.

07:00 p.m. – 07:10 p.m.

OTS03.4 High Accuracy Next Generation Air Traffic Surveillance System with Potential Cyber Attacks

Ahmed Abdelwahab Mohamed ElMarady, Kamel Rahouma*

Faculty of Engineering, Minia university and Egyptian Civil Aviation Authority

Abstract

Nowadays there is a crucial need to have an enhanced separation for air traffic to cope with the continuous increase in the number of flights. Existing traditional radar techniques are not suitable for precise positioning of aircraft, and so, cannot guarantee the requirements for next-generation surveillance systems. Recently, Automatic Dependent Surveillance-Broadcast (ADS-B) has been used to accurately determine the position of aircraft. Unfortunately, ADS-B technique suffers from potential cyber-attacks, such as jamming and spoofing. To validate the ADS-B signal and enhance the position of aircraft, ADS-B/Multilateration data fusion is used. Unfortunately, the existing localization verification techniques are not accurately suitable for spoofing detection. Likewise, cryptographic methods that use encryption methods require changing ADS-B protocol and so, changing the current fleet. In contrast, this paper presents a highly accurate and trusted surveillance framework that accurately detects potential spoofing attacks in ADS-B. Furthermore, the proposed framework uses data fusion of available trusted surveillance sensors, dynamic models of aircraft and flight information to achieve a very accurate surveillance system to be used for next-generation surveillance systems. Our results show that the proposed framework significantly detects the various kinds of spoofing attacks such as constant/frog-boiling attacks. In addition, our results show that the average positioning error of our proposed framework, with no spoofing or jamming in ADS-B, is 15.3 m. The resulting positioning accuracy improves the aircraft position by 49% and 49% compared to ADS-B and local area multilateration, respectively.

07:10 p.m. – 07:20 p.m.

OTS03.5 Classification of Diabetic Retinopathy (DR) using GCA Attention Mechanism Deep Neural Networks

Doha salah, Ahmed donkol, Gamal M. Dousoky*

Department of Electrical Engineering, Faculty of Engineering, Minia University, Egypt

Abstract

Diabetic retinopathy (DR) is the most frequent eye condition among diabetics and a leading cause of blindness. Effective management of the disease requires a regular fundus photography screening and a prompt action. The computer-aided, and entirely automated, diagnosis of DR has sparked a great attention due to the increasing number of diabetic patients and the extensive screening burdens they afford. Meanwhile, advances in deep neural networks have been achieved in various fields in the last several years. The challenge of early detection of DR is addressed in this study using a novel feature map global channel attention method (GCA). For DR color medical picture severity detection, a deep convolutional neural network model called GCA-Resnet101 (GRNet), GCA-VGG19 (GVNet), and GCA-InceptionV4 (GIANet) have been constructed using a flexible one-dimensional convolution kernel size approach dependent on the feature map dimension. A heat map shows the location of interest in the picture GIANet. The Kaggle competition's DR dataset has a final accuracy, precision, sensitivity, and specificity of 0.921, 0.901, and 0.875. According to several experiments, InceptionV4, based on the GCA attention mechanism, can better identify lesion characteristics and categorize the DR severity.

07:20 p.m. – 07:30 p.m.

OTS03.6 Novel Compact Microstrip Antennas with Two Different bands For 5G Applications

Hesham Emara, Hussein Ghouz, Sherif El Dyasti, Mohamed Fathy*

AASTMT

Abstract

In this paper, millimeter-wave (MMW) antennas with two different designs have been proposed for fifth generation (5G) wireless applications. These novel antennas have a greater fractional bandwidth and an appropriate gain, making them suitable for a variety of millimeter applications. Each antenna design has a different model and characteristics. The two designs resonate at different frequencies, 39.7 GHz and 43 GHz. A commercial electromagnetic simulator (CST-Studio) was used to construct and optimize the proposed models. The proposed MMW models are designed on a compact Rogers Substrate RT-5880 with a thickness of h = 0.508 mm, a loss tangent δ value of 0.0009, and a dielectric constant ε_r of 2.2. The proposed antennas have a simple design structure to ensure reliability, mobility, and high efficiency, which can be used for many (5G) wireless applications. The proposed models provide a moderate gain of 6 dBi to 7 dBi. The impedance bandwidth of the proposed models is equal to 2.7 GHz for the first model, and 3.1 GHz for the second model. The efficiency of the models is about 73.8% and 78%, respectively, which is sufficient to meet the requirements of 5G wireless applications.

07:30 p.m. – 07:40 p.m.

OTS03.7 Wind Forecasting Based on Hybrid Stochastic Scheme

Tamer Mohamed El-Saied,Ramadan Mohamed Mostafa Elwan, Omar Mohamed Salim*

faculty of engineering benha university

Abstract

Due to the abundance of renewable energy and the rapid advancement of wind energy extraction technologies, wind forecasting has garnered considerable interest. Wind forecasting is the process of extracting one or more features from time-series data to increase prediction accuracy. The various forecasting models for wind speed and power include physical, statistical, computer, and hybrid models. The steps involved in forecasting wind speed and energy are preprocessing the raw data, feature extraction, and prediction.,. In this work, hybrid prediction algorithms are combined with data analysis, decision making, and optimization. The results demonstrate an improvement in short- and medium-term prediction when compared to other computational techniques such as Weibull, (AR), and autoregressive integrated moving average (ARIMA). Numerical error evaluation approaches such as Mean Absolute Percentage Error Mean Square Error, and Mean Absolute Error was used to forecast the model's correctness. The results indicated that the hybrid model's projected error is signification less than that of the AR and ARIMA models independently.

1 ROOM (A - Main Hall)

2 ROOM (B)

3 ROOM (C)