6th International Conference and Exhibition on

Automobile & Mechanical Engineering

July 08-09, 2019 | Zurich, Switzerland

Scientific Tracks & Abstracts

Day 1

SESSIONS

Automotive Engine | Automotive Vehicles and design Technologies | Mechanical Engineering | Vehicular Automation and Automatic Driving | Computer-aided design& manufacturing CAD&CAM | Material Science | Mechanical Design and Manufacturing | Robotics & Automation

Chair: Hailong Zhang, Nanjing Normal University, China

SESSION INTRODUCTION

Title: Structural parameters optimization of a tubular permanent magnet linear machine for regenerative suspension
Hailong Zhang, Nanjing Normal University, China

Title: Gas turbine jet engine (GTJE)
Anatoliy Lokotto, Institute of Theoretical and Applied Mechanics-SB RAS, Russia

Title: Design of isooctane fueled plug flow reactor for vehicles with SOFC
Ergin KOSA, Beykent University, Turkey

Title: Supercomputer simulation of responsible automobile welded structures behavior
Sergey Medvedev, The National Academy of Sciences of Belarus, Belarus

Title: Development of a dynamic rolling stock model to predict the impact strength of derailment containment provisions
Jeong Seo Koo, Seoul National University of Science and Technology, South Korea

Title: Ensuring safety during operation of the first all-electric ferry
Annie Kortsari, Hellenic Institute of Transport , Greece

Title: One-shot® method and low-density bio-composite for automotive components
Alfonso Molaro, Sapa SPA, Itlay

Title: Towards holistic scene understanding in autonomous driving
Panagiotis Meletis, Eindhoven University of Technology, Netherlands

6th International Conference and Exhibition on

Automobile & Mechanical Engineering

July 08-09, 2019 | Zurich, Switzerland

Structural parameters optimization of a tubular permanent magnet linear machine for regenerative suspension

Hailong Zhang, Shuyu Shen, Wei Yan and **Enrong Wang**
Nanjing Normal University, China

The regenerative suspension can effectively recover the vibration potential energy of the vehicle suspension, thus has broad prospects in application. In this paper, a tubular permanent magnet linear motor with the Halbach array magnetic pole is analyzed. The magnetic field analysis method of the excitation source separation is proposed, and then the transient analytical model of output electromagnetic force and the external circuit characteristic under displacement excitation is established. A modified particle swarm optimization algorithm is adopted to optimize the structural parameters. By comparing with the finite element analysis, the correctness of the proposed analytical model and the structural parameters optimization are verified. This work lays the theoretical foundation for extensive application of regenerative suspension.

Biography

Hailong Zhang has received his BS degree in Electrical Engineering and PhD degree in Physical Electronics from the School of Electrical & Automation Engineering, Nanjing Normal University, Jiangsu, China, in 2010 and 2016, respectively. From 2017 till now, he was a Post-Doctoral Research Fellow with the School of Physics and Technology, Nanjing Normal University. He is currently a Lecturer in the School of Electric and Automation Engineering, Nanjing Normal University, Jiangsu Province. His current research interests include dynamical analyze and control of MR suspension and vibration power regeneration.

61204@njnu.edu.cn

Notes:

conferenceseries.com

6th International Conference and Exhibition on

Automobile & Mechanical Engineering

July 08-09, 2019 | Zurich, Switzerland

Gas turbine jet engine (GTJE)

Lokotko A V
Institute of Theoretical and Applied Mechanics-SB RAS, Russia

Gas turbine engines (GTE) have a number of advantages over reciprocating internal combustion engines. They have greater power density, full expansion of the working body (WB), greater resource due to balance and minimization of friction surfaces, less consumption of lubricating fluids, low requirements for fuel quality regardless of octane number, less time to prepare for launch. Meanwhile, GTE to yield the piston engines for fuel efficiency. This is determined by the insufficiently high thermal efficiency the ratio of useful work to the heat consumed due to the limiting temperature at the turbine inlet due to insufficient heat resistance of the turbine blades. To increase thermal efficiency by increasing the temperature of the WB, the concept of a gas turbine jet engine was proposed. This device is a Segner type wheel with a rotating combustion chamber (CC) and tangentially mounted nozzles. Torque is created by the reaction force of the jets flowing from the nozzles. The absence of turbine blades allowed increasing the temperature of the WB. The full expansion of the WB occurs in the system of rotors installed coaxially with the CC, and also equipped with jet nozzles. The cooling of the CC and the nozzles is carried out by a liquid metal coolant circulating due to centrifugal forces. Estimates show that at a WB temperature corresponding to the combustion temperature of a stoichiometric air-fuel mixture, the thermal efficiency in the design mode is 0.47; the specific fuel consumption is 0.25 kg/kWh, which is comparable with the corresponding figures for piston engines. The device was protected by a Russian patent for an invention and a German patent for a utility model. It is assumed that the engine can be used in hybrid vehicles to charge batteries. It requires the creation of a prototype engine for the experimental study of its characteristic.

Biography

Lokotko A V has completed his Graduation at Tomsk Polytechnic University with a degree in Internal Combustion Engines in 1961. He worked in Kamchatka as the Head of a Diesel Department at a power station from 1961-63. He has been working at the Institute of Theoretical and Applied Mechanics of the SB RAS since 1965. In 1987, he defended his thesis, and in 2003 his doctoral dissertation. He has more than 140 publications in periodicals. He is a Specialist in Applied Gas Dynamics and aerodynamically experimental methods.

lok@itam.nsc.ru

Notes:

conferenceseries.com

6th International Conference and Exhibition on

Automobile & Mechanical Engineering

July 08-09, 2019 | Zurich, Switzerland

Design of isooctane fueled plug flow reactor for vehicles with SOFC

Ergin Kosa, Cüneyt Ezgi and **Şeyma Özkara-Aydınoglu**
Beykent University,Turkey

Fuel cell vehicles are promising to reduce air pollution. The isooctane can be stored instead of hydrogen in vehicles with solid oxide fuell cell (SOFC). Hydrogen can be produced from fossil fuels through a process of fuel reforming using isooctane. The chemical reaction takes place under non-isothermal conditions in a plug flow reactor. In this study, a plug flow reactor is simulated for isooctane reforming reaction to produce hydrogen gas under both adiabatic and nonadiabatic conditions via a simulation software using finite element analysis. It is observed that the reactor temperature and fuel conversion is a function of the reactor volume for both cases. As the isooctane reforming reaction is endothermic, the temperature profile along the plug flow reactor displays different trends depending on whether the reactor is operated adiabatically or nonadiabatically. The reaction rate, which is also a function of reactor volume, is affected by the reactor temperature change. In addition; the temperature and composition of the feed stream are also investigated. It is found that temperature profile and hydrogen production yield along the reactor changes drastically according to the feed temperature, feed composition and heat exchange.

Biography

Cüneyt Ezgi is an Associate Professor and Head of the Department of Mechanical Engineering at Beykent University. He graduated from the Mechanical Engineering at Gazi University in 1991. He joined Turkish Naval Forces in 1993 as Naval Engineer Ensign. He received European Welding Engineering diploma from European Welding Federation in 1994. Dr. Ezgi received his Msc and Ph.D. degrees in the Department of Mechanical Engineering at Ege University in 2004 and 2009. He was certified as Energy Manager by EIE in 2011. He retired from Turkish Naval Forces at rank of Naval Engineer Captain in 2016. His general research interests are energy, heat transfer, thermodynamics, thermal systems engineering, refrigeration, heat exchangers, heat pumps, renewable energy, hydrogen and fuel cells, naval engineering systems.

Ergin Kosa is an Assistant Professor in the Department of Mechanical Engineering at Beykent University. He received his Bachelor (2008), Msc (2010) and Ph. D.(2016) degrees from İstanbul Technical University in Department of Mechanical Engineering. His research interests are fuel cells modeling, thermodynamics, erosive and abrasive wear, electroless coatings, compliant-MEMs, solar cells, sculptured thin films and solar cells.

cuneytezgi@beykent.edu.tr
erginkosa@beykent.edu.tr

Notes:

6th International Conference and Exhibition on

Automobile & Mechanical Engineering

July 08-09, 2019 | Zurich, Switzerland

Supercomputer simulation of responsible automobile welded structures behavior

Sergey Medvedev

The National Academy of Sciences of Belarus, Belarus

A new approach for welded structutes design based on computer, supercomputer and grid technologiesis is proposed- Predictive Welding Engineering (PWE), providing: computer design of welded structures (WS) on a basis of 3D parametrized models of functional elements. Computer simulation of welding in a free state on the assumption that all welds are applied simultaneously. Simulation of the interaction of a pre-stressed WS with external static and dynamic loads. Assessment of the availability and visibility of welds, taking into account the results of designing assembly-welding fixtures. Computer synthesis of fixtures by means of functional elements libraries. Assessment of changes in the residual stress-strain state of WS in the fixture as compared to free welding. Simulation of the interaction of external loads with stress-strain state after assembly-welding in the fixture. Supercomputer stress-tests under conditions of an ideal state of welded joints, taking into account the level of allowable and unacceptable weld defects (corresponding cracks, undercuts, lack of penetration, etc.). Off-line description of working tool tracks of welding robot and checking the correctness of the control program in the appropriate tool environment. PWE can provide the engineering prediction of welded structure behavior in dynamic extreme operating conditions. Supercoputer simulation could be illustraited in real time by means of internet and supercomputer resources of Supercomputer Remote Access Center in Minsk (Belarus).

References

1. Medvedev S V (2002) Computer modeling of residual welding strains in technological design of welded structures. Welding International. 16(1):59-65.

Biography

Sergey Medvedev has completed his PhD at Institute of Engineering Cybernetics of Academy of Sciences of Belorussian Soviet Social Republic and Dsc from United Institute of Informatics Problems (UIIP), National Academy of Sciences of Belarus. He is the Head of the Laboratory of Technical System Synthesis of UIIP. He has published more than 150 papers in reputed journals and materials of scientific conferences.

medv@newman.bas-net.by

Notes:

6th International Conference and Exhibition on

Automobile & Mechanical Engineering

July 08-09, 2019 | Zurich, Switzerland

Development of a dynamic rolling stock model to predict the impact strength of derailment containment provisions

Jeong Seo Koo

Seoul National University of Science and Technology, South Korea

As the operating speed of train increases, there is a growing interest in reducing damage caused by derailment and collision accidents. Since the collision with the surrounding structure after a derailment accident causes a great damage, the derailment containment provision (DCP) should be installed to reduce the damage due to the secondary collision accident. However, the criteria to design the DCP such as locations and design loads are not clear because of difficulties in predicting derailment and collision behaviors. In this paper, we derived a dynamics bogie model which can predict derailment and collision behaviors in the design phase of the DCP. The derived bogie model was simplified for various frames and suspensions to reduce the simulation time. Also, the actual derailment tests were conducted on a real test track to verify the reliability of the bogie model in terms of impact accelerations and derailment behaviors under a trial derailment containment provision. The simulation results of the developed model showed reasonable agreements to the test results. Using the developed modeling technique, we developed a dynamic power car model of the Korean high speed train to predict and design the tolerable impact strength of DCP. We could obtain a reasonable impact strength of DCP.

Biography

Jeong Seo Koo has completed his PhD at the KAIST, and worked at national research institutes like the KIST, the KIMM and the KRRI from 1987 to 2005. He is the Dean of the Railway Safety Department at the Seoul National University of Science and Technology. He has published more than 100 papers in reputed journals.

koojs@seoultech.ac.kr

Notes:

conferenceseries.com

6th International Conference and Exhibition on

Automobile & Mechanical Engineering

July 08-09, 2019 | Zurich, Switzerland

Ensuring safety during operation of the first all-electric ferry

Annie Kortsari
Hellenic Institute of Transport, Greece

Ferries for passengers and cars are popular especially in Europe, with main markets being Northern Europe/ Baltic and the Mediterranean. As ferries have a long life span and since energy efficiency has not been a focal area until recently, many energy inefficient ferries are in operation in Europe. The European fleet is in need of newer, more energy efficient and less CO_2 emitting and polluting types.The E-ferry Project, co-funded under the Horizon 2020 Programme, aims to support and promote energy efficient, zero greenhouse gas (GHG) emissions and air pollution free waterborne transportation for islands, coastal zones and inland waterways in Europe and beyond. This will be achieved through the application of an extremely energy efficient design concept and the demonstration of a 100% electric, emission free, medium sized ferry for passengers and cars, trucks and cargo in full scale operation on longer distances than previously seen.All-electric vessels face a number of challenges related to operation and safety. The absence of other energy sources means that the pack must function at all times, under all conditions to maintain the vessel's operability/manoeuvrability. Absolute reliability is achieved by innovative battery technology allowing the vessel to operate at all times. The largest battery pack (4.3MWh) has a weight impact, affecting the vessel's draft and efficiency and putting focus on weight saving. Furthermore, effective thermal management is essential for safety and pack longevity. These multiple conflicting requirements shaped the E-Ferry concept which at the same time needed to absolutely safe and reliable.

Biography

Annie Kortsari is a Research Associate at HIT/CERTH and Impact Manager of the E-Ferry project. She holds a degree in Civil Engineering from the Aristotle University of Thessaloniki and an MBA from the University of Macedonia, Greece. She is currently a PhD candidate in the area of railway transport with her thesis focusing on railway freight transport between Europe and Asia. She has been working in the Institute since 2005 and has participated in numerous research projects and transport studies. Her expertise is on railway transport systems, maritime transportation, mobility management, seasonal transport demand management and intelligent transport systems.

akorts@certh.gr

Notes:

conferenceseries.com

6th International Conference and Exhibition on

Automobile & Mechanical Engineering

July 08-09, 2019 | Zurich, Switzerland

One-shot® method and low-density bio-composite for automotive components

Alfonso Molaro
Sapa SPA, Italy

The completely automation of a manufacturing processes lead to higher production rates and increased productivity, better product quality, improved safety and reduced factory lead times. The One-Shot® Method was created to include all of the steps of traditional car components manufacturing into a single an all-in-one process. The One-Shot® C lower pillar is a multi-component, consisting of a part made of thermoplastic material, a layer of sound-absorbing polyurethane foam material and a fabric or leather covering.

Biography

Alfonso Molaro is an R&D engineer at SAPA SPA, a manufacturer of interior, exterior and under hood vehicle parts. He graduated from the University of Naples Federico II in Materials Engineering. He's got a postgraduate master's degree in development, characterization and injection molding of thermoplastic techno-polymers. His current research activities concern the development of low density and high-performance thermoplastic composites, industrial process automation and continuous improvement of product quality.

alfonso.molaro@sapagroup.it

Notes:

conferenceseries.com

6th International Conference and Exhibition on

Automobile & Mechanical Engineering

July 08-09, 2019 | Zurich, Switzerland

Towards holistic scene understanding in autonomous driving

Panagiotis Meletis
Eindhoven University of Technology, Netherlands

Holistic scene understanding is a vital component of the self-driving vehicles of the future. It is crucial that those vehicles are able to understand and interpret their environment in order to drive safely. This requires precise detection of surrounding objects (vehicles, humans, traffic objects, nature), discrimination between drivable and non-drivable surfaces (road, sidewalk, buildings) and segmentation of static and dynamic objects into high-level semantic classes. In the past, computer vision has tackled these problems separately due to their complexity and high computational needs. Nowadays, deep learning-based systems are trained on manually annotated datasets to solve these problems, however they face multiple challenges: 1) the number of the annotated semantic classes are limited by the available datasets to few dozen decreasing the variety of recognizable objects, 2) the density of annotations is inversely proportional to the size of the datasets, rendering huge dataset incompatible for precise segmentation, and 3) detection and segmentation are solved separately, that leads to higher memory and computational demands. Our research addresses the aforementioned challenges by proposing new methods to: 1) train a single network on multiple datasets with different semantic classes and different type of annotations, and 2) solve simultaneously with a single network the problems of detection and semantic segmentation. We have deployed those networks in our autonomous driving car with real-time performance. We demonstrate state-of-the-art results, together with a fivefold increase in the number of recognizable classes, and we integrate efficiently detection and segmentation into a joint panoptic segmentation system, taking important steps towards achieving holistic scene understanding.

Biography

Panagiotis Meletis is in the last year of his PhD in the Signal Processing Systems lab of Eindhoven University of Technology (TU/e). He is a Member of Mobile Perception Systems research cluster, where he develops image recognition algorithms for its autonomous driving car. He is also a TU/e Ambassador of the TU/e Communication Department.

p_c_meletis@yahoo.com

Notes: