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Aim and Scope

Journal of Mechatronics, Electrical Power, and Vehicular Technology (MEV) is an internationally peer-reviewed journal aims to provide authoritative global source of scientific information for researchers and engineers in academia, research institutions, government agencies, and industries. The Journal publishes original research papers, review articles and case studies focused on:

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FOREWORD FROM EDITOR-IN-CHIEF

Journal of Mechatronics, Electrical Power, and Vehicular Technology (MEV) is an international journal indexed by many internationally recognized indexers. Its Digital Object Identifier (DOI) Prefix is 10.14203. In this issue, six papers are published with the authors diversity came from Indonesia, Taiwan, Japan, Australia, and Italia.

The papers come from multidisciplinary topics including mechatronics, electrical power, and vehicular technology. They may be classified as follows. Two papers are related to mechatronics which address speed control of a sensorless BLDC motor and computer vision-based distance estimation for VANET application. Three papers fall in electrical power topic. The first paper presents load characteristic analysis of a double-side internal coreless stator axial flux PMG. The second paper proposes a method for optimization of quasi-flat linear PM generator using simulated annealing algorithm for WEC in Indonesia. The third paper describes a smart grid photovoltaic system pilot scale using sunlight intensity and state of charge (SoC) battery based on Mamdani fuzzy logic control. One paper deals with vehicular technology topic i.e. exhaust emissions analysis of gasoline motor fueled with corncob-based bioethanol and RON 90 fuel mixture.

Since the first volume, our journal provides discretion in financial term by waiving the article processing charge.We would like to acknowledge our immense gratitude to our International Editorial Board members, reviewers and authors.

We hope this publication would contribute to the enhancement of science and technology.

Bandung, December 2019

Editor-in-Chief

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ABSTRACTS SHEET

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Muhammad Rif'an [a, *], Feri Yusivar [b], Benyamin Kusumoputro [b] ([a] Department of Electrical Engineering, Universitas Negeri Jakarta, Indonesia; [b] Department of Electrical Engineering, Universitas Indonesia, Indonesia)

Sensorless-BLDC motor speed control with ensemble Kalman filter and neural network

Journal of Mechatronics, Electrical Power, and Vehicular Technology, 2019, vol. 10, no. 1, p. 1-6, 6 ill, 0 tab, 17 ref.

The use of sensorless technology at BLDC is mainly to improve operational reliability and play a role for wider use of BLDC motors in the future. This research aims to predict load changes and to improve the accuracy of estimation results of sensorless-BLDC. In this paper, a new filtering algorithm is proposed for sensorless brushless DC motor based on Ensemble Kalman filter (EnKF) and neural network. The proposed EnKF algorithm is used to estimate speed and rotor position, while neural network is used to estimate the disturbance by simulation. The proposed algorithm requires only the terminal voltage and the current of three phases for estimated speed and disturbance. A model of non-linear systems is carried out for simulation. Variations in disturbances such as external mechanical loads are given for testing the performance of the proposed algorithm. The experimental results show that the proposed algorithm has sufficient control with error speed of 3 % in a disturbance of 50 % of the rated-torque. Simulation results show that the speed can be tracked and adjusted accordingly either by disturbances or the presence of disturbances.

(Author)

Keywords: ensemble Kalman filter; neural network; sensorless; brushless DC motor.

Mulia Pratama [a, *], Giambattista Gruosso [b], Widodo Budi Santoso [a], Achmad Praptijanto [a] ([a] Research Centre for Electrical Power and Mechatronics, Indonesian Institute of Sciences, Indonesia; [b] Department of Electronics, Informatics and Bioengineering, Politecnico di Milano, Italy)

Vehicular networking and computer vision-based distance estimation for VANET application using Raspberry Pi 3

Journal of Mechatronics, Electrical Power, and Vehicular Technology, 2019, vol. 10, no. 1, p. 7-16, 12 ill, 4 tab, 19 ref.

This research was implementing vehicle networking using WIFI connection and computer vision to measure the distance of vehicles in front of a driver. In particular, this works aimed to improve a safe driving environment thus supporting the current technology concept being developed for inter-vehicular networking, VANET, especially in its safety application such as Overtaking Assistance System. Moreover, it can wirelessly share useful visual information such as hazard area of a road accident. In accordance with Vehicle-to-Vehicle (V2V) concept, a vehicle required to be able to conduct networking via a wireless connection. Useful data and video were the objects to be sent over the network established. The distance of a vehicle to other vehicles towards it is measured and sent via WIFI together with a video stream of the scenery experienced by the front vehicle. Haar Cascade Classifier is chosen to perform the detection. For distance estimation, at least three methods have been compared in this research and found evidence that, for measuring 5 meters, the iterative methods shows 5.80. This method performs well up to 15 meters. For measuring 20 meters, P3P method shows a better result with only 0.71 meters to the ground truth. To provide a physical implementation for both the detection and distance estimation mechanism, those methods were applied in a compact small-sized vehicle-friendly computer device the Raspberry Pi. The performance of the built system then analyzed in terms of streaming latency and accuracy of distance estimation and shows a good result in measuring distance up to 20 meters.

(Author)

Keywords: computer vision; Haar Cascade Classifier; distance estimation.

Ketut Wirtayasa [a, b, *], Pudji Irasari [a], Muhammad Kasim [a, c], Puji Widiyanto [a], Muhammad Fathul Hikmawan [a] ([a] Research Centre for Electrical Power and Mechatronics, Indonesian Institute of Sciences, Indonesia; [b] Department of Electrical Engineering, National Taiwan University of Science and Technology, Taiwan; [c] School of Electrical Engineering and Telecommunications, University of New South Wales, Australia)

Load characteristic analysis of a double-side internal coreless stator axial flux PMG

Journal of Mechatronics, Electrical Power, and Vehicular Technology, 2019, vol. 10, no. 1, p. 17-23, 9 ill, 4 tab, 13 ref.

The main issue of using a permanent magnet in electric machines is the presence of cogging torque. Several methods have been introduced to eliminate it, one of which is by employing a coreless stator. In this paper, the load characteristic analysis of the double-side internal coreless stator axial flux permanent magnet generator with the specification of 1 kW, 220 V, 50 Hz, 300 rpm and 1 phase is discussed. The purpose is to learn the effect of the load to the generator performance, particularly the output power, efficiency and voltage regulation. The design and analysis are conducted analytically and numerically with two types of simulated loads, pure resistive and resistive-inductive in series. Each type of load provides power factor 1 and 0.85 respectively. The simulation results show that when loaded with resistive load, the generator gives a better performance at the output power (1,241 W) and efficiency (91 %), whereas a better voltage regulator (5.86 %) is achieved when it is loaded with impedance. Since the difference in the value of each parameter being compared is relatively small, it can be concluded that the generator represents good performance in both loads.

(Author)

Keywords: coreless stator; axial flux permanent magnet generator; load characteristics; resistive load; resistive-inductive in series.

Widiyanti [a, *], Muhammad Alfian Mizar [a], Christian Asri Wicaksana [b], Didik Nurhadi [a], Kriya Mateeke Moses [c] ([a] Department of Mechanical

Engineering, State University of Malang, Indonesia; [b] Bachelor Program, Department of Mechanical Engineering, State University of Malang, Indonesia; [c] Graduate school of technological and vocational education, National Yunlin University of Science and Technology, Taiwan)

Exhaust emissions analysis of gasoline motor fueled with corncob-based bioethanol and RON 90 fuel mixture

Journal of Mechatronics, Electrical Power, and Vehicular Technology, 2019, vol. 10, no. 1, p. 24-28, 2 ill, 1 tab, 36 ref.

One of the viable solutions to the fossil fuel energy crisis was to seek alternative sources of environmentally friendly energy with the same or better quality such as bioethanol. It was possible to produce bioethanol from organic waste, e.g., corncob. This research aimed to obtain the lowest exhaust emission levels of CO and CO_2 generated from a gasoline motor that used a mixture of bioethanol containing 96 % corncob and RON 90 fuel. This research was experimental using Anova statistical data analysis method. The results showed that the lowest average of CO emissions was 0.177 vol% using E100 fuel, and the highest average was 2.649 vol% using 100 % RON 90 fuel, displaying a significant difference. The lowest average of CO_2 emissions was 6.6 vol% using E_{100} fuel, and the highest was 7.51 vol% using 100 % RON 90 fuel, which was insignificantly different. The mixture variation with the lowest CO and CO_2 emissions was E_{100}.

(Author)

Keywords: RON 90 fuel; corncob-based bioethanol; gasoline generator; CO and CO_2 exhaust emissions.

Budi Azhari [a, *], Francisco Danang Wijaya [b] ([a] Research Centre for Electrical Power and Mechatronics, Indonesian Institute of Sciences, Indonesia; [b] Department of Electrical Engineering and Information Technology, Engineering Faculty, Universitas Gadjah Mada, Indonesia)

Quasi-flat linear PM generator optimization using simulated annealing algorithm for WEC in Indonesia

Journal of Mechatronics, Electrical Power, and Vehicular Technology, 2019, vol. 10, no. 1, p. 29-35, 10 ill, 3 tab, 15 ref.

Linear permanent magnet generator (LPMG) is an essential component in recent wave energy converter (WEC) which exploits wave's heave motion. It could be classified into tubular-type, flat-tricore type, and quasi-flat type. In previous researches, these three models have been studied and designed for pico-scale WEC. Design optimization has further been conducted for flat-tricore LPMG, by using simulated annealing (SA) algorithm. It modified some parameters to minimize the resulted copper loss. This paper aims to optimize a quasi-flat LPMG design by applying SA algorithm. The algorithm would readjust the initial LPMG parts dimension. Then, the output of the optimized design would be analyzed and compared. The results showed that the optimization could reduce the copper loss by up to 73.64 % and increase the efficiency from 83.2 % to 95.57 %. For various load resistances, the optimized design also produces larger efficiency. However, the optimized design has a larger size and produces larger cogging force than the initial design.

(Author)

Keywords: design optimization; copper loss; simulated annealing; quasi-flat LPMG.

Kamil Faqih [a, *], Wahyu Primadi [a], Anik Nur Handayani [a], Ari Priharta [a], Kohei Arai [b] ([a] Electrical Engineering Postgraduate, Electrical engineering Department, Universitas Negeri Malang, Indonesia; [b] Department of Information Science, Saga University, Japan)

Smart grid photovoltaic system pilot scale using sunlight intensity and state of charge (SoC) battery based on Mamdani fuzzy logic control

Journal of Mechatronics, Electrical Power, and Vehicular Technology, 2019, vol. 10, no. 1, p. 36-47, 20 ill, 2 tab, 16 ref.

The Utilization of renewable energy such as a photovoltaic system is the foremost alternative in transfers generated by conventional power plants, but the lack of photovoltaics is support for light intensity. The purpose of this research is to develop a pilot-scale smart grid photovoltaic system that can regulate the supply of electrical energy from either the battery or the power supply. The control system in this study uses the Mamdani fuzzy logic method in determining automatic system performance. This system monitors the intensity of light and battery which are then used as automatic safety parameters on the power supply, battery, and photovoltaic. The results of this study display the indicator results from the microcontroller in supplying electrical energy for the use of electrical loads, Power Supply has been served the load when the battery is in a low state which have a voltage <11 Volts, the battery has been served the load when the condition of the battery is in a medium and high condition which has a voltage of 11.5 <; ....; <13 Volts. PV has been served batteries or loads when the light intensity is cloudy and bright which have a light intensity of 3585 <; ...; <10752 Lux. This system can reduce dependence on conventional energy without reducing the quality of the energy supply at load and Photovoltaic system dependence on light intensity does not affect the supply of energy consumption to electrical loads.

(Author)

Keywords: renewable energy; photovoltaic systems; fuzzy logic.