

DUNAREA DE JOS UNIVERSITY OF GALATI
FACULTY OF AUTOMATION, COMPUTERS SCIENCE, ELECTRICAL AND
ELECTRONICS ENGINEERING



ISEEE-2021

**The 7th International Symposium on Electrical and
Electronics Engineering**

October 28-30, 2021
Galați, Romania

ABSTRACT VOLUME



THURSDAY					
28 OCTOBER 2021					
9:30 – 11:30	REGISTRATION (Microsoft Teams)				
12:00 – 12:30	Welcome to the 7th edition of the International Symposium on Electrical and Electronics Engineering Opening Session (General)				
12:30 – 13:00	PLENARY SESSION (PS1) - (General)				
13:00 – 13:15	Break				
13:15 – 13:45	PLENARY SESSION (PS2) - (General)				
13:45 – 14:30	Break				
TECHNICAL SESSIONS					
14:30 – 16:30	TS1 (Channel 1)		TS3 (Channel 3)		TS5 (Channel 5)
16:30 – 17:30	REGISTRATION (Microsoft Teams)				
FRIDAY					
29 OCTOBER 2021					
10:00 – 12:00	REGISTRATION (Microsoft Teams)				
12:15 – 12:45	PLENARY SESSION (PS3) - (General)				
12:45 – 13:00	Break				
TECHNICAL SESSIONS					
13:00 – 15:00	TS4 (Channel 4)		TS6 (Channel 6)		TS2 (Channel 2)

PLENARY SESSIONS

28 October 2021 | **PS1 12.30 - 13.00** | Chair: Marian Găiceanu

Mihai Octavian POPESCU, Claudia Laurenta POPESCU
Politehnica University of Bucharest, Romania

Strategic Directions of Application Research in Electrical Engineering on the Horizon 2050

Abstract — Romania, as an industrial country, evolved extensively and intensively until the 1990s. Conceptually, following the model of the Soviet Union, the heavy industry developed with priority, with its pivot, the machine building industry. The basis of this process was electrification, which began practically in 1950 and reached over 20,000 MW of installed capacity in the 80s. After 1989 the evolution of the industry was contradictory by moving to a market economy, privatization and changing the nature of property. The restructuring followed due to the evolution towards the information society. We accept by convention, a century as a unit of measurement of an economic-industrial cycle, so a quarter of a cycle is a significant interval to highlight strategic trends. It is based on the interval 2000-2025 and is compared with the forecast 2025-2050. The 2050 time horizon seems to be prolific for global energy issues. Many organizations and think tanks are developing strategies for the evolution of energy in the medium and long term, meaning the years 2030-2050. The Skalin Institute has published a list of the significant strategic directions of evolution with a time horizon of 2030-2050. These are the following: Smart Electrical Networks - "Smart Grid", mixed energy-information structures; Electric and hybrid car; Wireless transfer of electricity; Wireless monitoring and diagnostic data transmission system; Artificial intelligence; complex algorithms and machine learning; Procedures and schemes for professional development; Economic technologies for ecological lighting; Innovation; Digitization of bureaucratic activities; Internet of Things.

28 October 2021 | **PS2 13.15 - 13.45** | Chair: Marian Găiceanu

Andrei MARINESCU
Romanian Academy of Technical Sciences, Craiova Branch

Current Standards and Regulations for Wireless Battery Charging Systems

Abstract — With the unprecedented development of electric vehicles that require high-power fast charging systems, wireless charging systems have not been lately of the same interest to the public and EV manufacturers as they were a decade ago. Most of the systems that are currently used are based on conductive (plug-in) charging. In fact, the situation is different: the requirements have changed lately with the proliferation of autonomous and connected vehicles operating in the air, in the water and on land (roads and factories), for which the automatic charging of batteries with no human intervention and no contact is a mandatory condition. That is why regulatory and standardization bodies around the world carry out an intense activity in the field of wireless charging. After the successful implementation of low-power wireless systems for medicine and mobile terminals, maintaining the level of the electromagnetic effects on the population within specified limits and the concept of interoperability between systems have become mandatory for high-power wireless systems. The paper draws attention to the fact that, although the standards in any field of activity are not mandatory, they represent an irreplaceable guide for both researchers and designers who develop applications to produce and market them. The paper presents the current state of standardization of wireless charging systems for electric power, both in terms of functionality and electromagnetic compatibility.

29 October 2021 | **PS3 12.15-12.45** | Chair: Marian Găiceanu

***New Achievements in the Rotor Field-Oriented Control for Autonomous Locomotives
Part 2: Control Implementation and Experimental Performances at Low Speed***

Alexandru BITOLEANU, Mihaela POPESCU, Constantin Vlad SURU and Lavinius Sorin GORECI
University of Craiova

Abstract — The paper is dedicated to the experimental determination of the performances of the traction system of an autonomous electric locomotive. The traction system is composed by the voltage inverter and induction motors and its control is based on the indirect rotor field-oriented control (IFOC) method. For this particular application, the IFOC implementation has some major difficulties. First, the motors' voltage cannot be used for vector field identification because it is strong distorted. On the other part, the control structure contains four controllers distributed on the two interconnected control ways and their tuning is very complicate. In order to mitigate these difficulties, the authors have developed a modified structure by using two hysteresis current controllers. Next, the control algorithm has been developed and implemented on the dSPACE 1104 DSP board. In order to test the entire system, a dedicated experimental stand that uses the recovery of the mechanical energy of the motor was used. The experimental evaluation was performed to determine the dynamic and static performances over entire speed domain.

TECHNICAL SESSION 1

TS1 - Power Electronics and Electrical Drives I		Technical Session 1
Chair	Mihai-Octavian POPESCU Mihaela POPESCU, Alexandru BITOLEANU	
Secretary	Cristinel Radu DACHE	

Paper 19

Mihaela POPESCU, Alexandru BITOLEANU - *New Achievements in the Rotor Field-Oriented Control for Autonomous Locomotives*

Abstract—This paper is focused on the use of indirect rotor field-oriented control for an asynchronous motor used in the traction system of an autonomous locomotive. The equations of operation are first introduced. The control scheme is illustrated and discussed in the complex variant of voltage control, as well as in the simpler variant of current control. For the second control variant, the design of speed and rotor flux controllers is presented. To validate the rotor flux estimation block, the influence of the waveform of the supply voltage and sampling time on the flux calculation is determined. Then, the performance of the control system for two prescribed speeds (twenty percent of rated speed and by fifty percent higher than the rated speed) is analysed. The control system and algorithm are validated by the obtained results.

Paper 37

Constantin Vlad SURU, Mihaela POPESCU, Mihaita LINCA, Mircea DOBRICEANU – *Control Implementation for Battery Charging in Autonomous Locomotive on dSPACE 1104 DSP Board*

Abstract—The aim of this paper is the implementation of the control algorithm of a charging system for a battery power electric vehicle (autonomous locomotive). Because modern electric vehicle use lithium based batteries, the charging system must assure the proper charging conditions, specific to the battery type. The control algorithm implementation was done in the Matlab Simulink environment, for the dSPACE DS1104 prototyping board. The experimental validation of the correct implementation of the control algorithm was done on a high power, specially designated experimental stand. The system gives good performance, the current absorbed from the power grid having low harmonic distortion and unity power factor. The voltage harmonic distortion is rather high in the power grid transformer output (which is the input of the battery charging system), but considerably lower at the power transformer input, and within standards.

Paper 36

Alexandru SAVULESCU - *Study of an objective function of the energetic parameters for the electric drive of a beam pumping unit*

Abstract— The process of extracting crude oil with an electric driven pumping unit is conditioned by several specific energetic parameters, such as crude oil flow rate, specific energy consumption, P_{break}/P_{useful} ratio, power factor and efficiency. It is necessary to study the process in relation to each parameter, but then, it is desired to establish an objective function for the respective process, which simultaneously includes several parameters, with different weights. In the case analyzed here, we will refer to a crude oil beam pumping unit in Canadian version for which all constructive data were obtained and for which the data files with all the values of the mechanical parameters could be calculated, necessary to achieve a simulation scheme adapted to the real model. The aim is to obtain a finality of this objective function, such as a maximum of its value in relation to some certain factor, the operating frequency and the k_i / k_p domain of the speed controller of the electric drive.

Paper 24

Alexandru SAVULESCU - *A possibility of energy recovery in the electric drive of crude oil pumping units*

Abstract— The electric drives of Canadian-type beam pumping units have a special operation, in the sense that in the same pumping cycle the electric machine works as an energy absorbing motor, but also works as a generator dissipating significant energy. A technical possibility to achieve a variant of energy recovery during the periods of dynamic braking of the electric drive system of beam pumping unit is the utilisation of a rechargeable battery, and the performed simulations proved the validity of this solution. An attractive operating hypothesis is the operation of pumping unit in parallel on a single power supply with a common DC bus. In this case, not all of the recovered energy contributes to recharging the rechargeable battery, but part of it is reused by the other pumping units. The particular case analysed refers to two pumping units connected in parallel and results obtained are edifying.

Paper 34

Alexandru DUSA, Emil Mina ROSU, Silviu Ionut EPURE, Razvan Constantin SOLEA, Marian GAICEANU, Arsene Liviu SORIN - *Improving the power quality using the Active Power Filter. Experimental results*

Abstract— This paper presents a simulation study and an experimental implementation of a three-phase parallel Active Power Filter, to improve the power quality by attenuating harmonics in the current and improving the power factor. The control strategy of the Active Power Filter for this work is Indirect Control. In the first stage, the Active Power Filter is evaluated by simulation in Matlab/Simulink and then experimentally validated on a laboratory stand. On the software side, LabView was used with the NI cRIO 9039 chassis and the NI 9223 and NI 9402 modules. Both the simulation results and the experimental results demonstrated the improvement of the power quality by using the Active Power Filter.

TECHNICAL SESSION 2

TS2 - Data & Signal Processing	Technical Session 2
Chair	Horia Nicolai TEODORESCU Laurentiu FRANGU
Secretary	Rustem POPA

Paper 2

Speranta Cecilia BOLEA - *Implementation of an Algorithm for Automatic Segmentation of Texts based on Stylometric Analysis*

Abstract — Segmenting the text into larger or smaller parts is useful for natural language processing. Starting from the initial segmentation of the literary text into three segments, (made by the author or a supposed expert reader), we developed an algorithm that segments the document at the page level, (a page being composed by a number of phrases), while keeping the number of initial sections (as they appear in the printed document). In this paper we present a program / software application for stylometric analysis, including the computation of some distances (Euclidean, Cosine) and other measurements (Bray - Curtis Dissimilarity, Correlation), for the obtained segments, in order to find out which is the best segmentation of the text. The software we developed has the purpose of exemplifying the algorithm and it matters little in what language or form it is made.

Paper 12

Horia Nicolai TEODORESCU, Marius HAGAN - *Correlational Analysis of Foot Plantar Pressure Signals*

Abstract— A correlational analysis method is developed for the automatic detection of irregularities of the gait as a sign of the instabilities of the locomotion and of the related neuro-muscular control. The dynamic analysis is based on the local correlation of the gait signals and is applicable to all types of signals acquired during locomotion, including pressure signals and parameters extracted through video monitoring. The foundations of the dynamic analysis method are exposed and the sensitivity and specificity of the method are derived based on theoretical considerations. The dynamic correlational analysis is exemplified with gait signals and the high sensitivity is demonstrated. Among the advantages of the dynamic relative method compared with the common period-based event detection are the lower sensitivity to amplitude variations, the capability of identifying phase changes between signals, and higher sensitivity to minor events such as small changes in the duration of the movements.

Paper 15

Horia-Nicolai Teodorescu - *Noise Equilibrium Frequency as a Measure of the Low Noise Devices Quality Involves the Lambert Function*

Abstract – We describe a new type of application where the optimization of the noise performance is related to the Lambert W function. The noise-equilibrium (balance) frequency of a physical process (or device) is defined as that upper frequency of the frequency band where the contributions of white and f^{-1} noises are equal, given the lower frequency of the band. The noise-equilibrium frequency is found as the solution expressed with the Lambert function.

Paper 26

Marius Sorin PAVEL, Rustem POPA - *An algorithm for pseudocoloring images in FPGA*

Abstract — An FPGA circuit (Field Programmable Gate Array) is one of the most flexible programmable integrated circuits that allow the user to build his own hardware architecture optimized for a specific application. Implementation of algorithms in hardware is possible using these circuits, even having some advantages related to their execution speed. In this paper we aim to build in MATLAB a simple algorithm for pseudocoloring a monochrome image, and then to implement the same algorithm in FPGA. The idea used is to assign to the value of each pixel in the image other three values, corresponding to the 3 color matrices R, G and B, which form the color image. These values are assigned based on a conversion table. The two color images are then compared in terms of accuracy and execution speed of the algorithms.

Paper 16

Simona Vasilica OPREA, Adela BARA, Gabriela DOBRITA - *Big Data Solutions for Extracting Load Flexibility Potential and Assessing Benefits*

Abstract—Large datasets generated by smart meters are more and more frequent in electricity consumption. This paper explores and compares a couple of big data solutions to handle massive volumes of data and extract valuable insights to improve retailers' business and consumers' benefits. There are many smart meter data applications, but one of the most recent applications with smart meter data is related to the flexibility potential of the commercial buildings that could be traded and assessment of the benefits. There is a variety of Demand Response (DR) programs that can be implemented to electricity residential or commercial consumers. However, the successful implementation of DR programs depends on the characteristics of electricity consumers and their consumption behavior that can be found out using big data solutions such as complex libraries that free the computer's memory by splitting the large datasets into chunks and use the concept of lazy computation and memory mapping. Thus, we propose a calculation method for evaluating the flexibilities and benefits of the commercial buildings' owners. Reference smart meter generic data for 16 types of commercial buildings in the U.S.A. is processed to create relevant simulations, identify flexibility potential using previous studies and calculate the gains related to such DR services.

Paper 27

Bogdan IONESCU, Marian CRACIUN, George PETREA, Silviu EPURE, Catalin Petrica ARAMA, Ciprian VLAD - *Health home-monitoring system based on IoT*

Abstract—The recent COVID-19 pandemic highlighted that there is a lot of work to do regarding the integration of digital technologies in healthcare. Actual trending offers the possibility to patients to have permanent knowledge about their health status and not to go to have a general check when some symptoms appear. Internet of Things (IoT) has also reached the medical area and can offer high quality solutions. After this step is taken the data collected and stored locally or remote in the cloud can be easily reached, analyzed and health monitoring for each patient is much improved.

TECHNICAL SESSION 3

TS3 - Power Electronics and Electrical Drives II	Technical Session 3
Chair Emil CAZACU Marian GAICEANU	
Secretary Marius George SOLOMON	

Paper 5

Emil CAZACU, Marian BARBU, Lucian PETRESCU - *Inrush current and ferroresonance in low-voltage networks – An integral approach*

Abstract — The work suggests a synchronous instigation of two transients: inrush current and ferroresonance. These could occur in actual low-voltage networks at the switching moment of different devices with iron-cores (e. g. light loaded transformers). Correspondingly, a time-domain investigation is carried-out by adopting a circuit-model for the transformer and by solving the corresponding differential equations, which describe the inrush current and ferroresonance transient and stationary phenomena. The core magnetic properties of the transformer are adequately modelled by a descriptive relation that properly covers the device saturation area. Thus, the time evolution of the circuit is predicted instantly after the energizing process and the major features of these power quality issues are critically examined. Supplementary, some mitigation technique of both phenomena detrimental consequences on the network are also proposed. The entire analysis is illustrated on toroidal transformer with a rated power of 500 VA often encountered in low-voltage installations.

Paper 22

Marius DRANCA, Mihai CHIRCA, Stefan BREBAN, Daniel FODOREAN - *Comparative Design Analysis of Two Modular Permanent Magnet Synchronous Generators*

Abstract — This paper approaches an analysis design of two modular radial flux permanent magnet machines intended for use as direct-driven generators in small-scale wind energy systems applications. A three-phase synchronous generator with a surface mounted permanent magnet rotor is compared with an interior spoke type permanent magnet rotor topology. Finite element analysis is carried out and comparative results show that both topologies are suitable solutions for the targeted application.

Paper 25

Marius George SOLOMON, Marian GAICEANU - *The Optimization of the Dynamic Regime of the Asynchronous Vectorial AC Motor in Flying Shear*

Abstract—The high-performance length cutting lines of the strip use the Flying Shear, a mechanism that is moved by a vector controlled three-phase asynchronous motor. The operating principle of the cutting line involves a complex dynamic regime, continuous cutting of the strip in sheet at a maximum speed of 45 meters per minute (mpm), where the entire mechanism of the flying shear are moving backward and forward to perform the cut and return to zero point position. Due to the frequents reversing process, the objective of this paper is to optimize the dynamic regimes of the process in order to minimize the energy consumption. From the hierarchical control architecture, the induction motor control is performed at the First Level, where the PLC device sets the direction of movement and the speed value reference, and a Simotion Drives (D425) transforms the PLC's sets into electrical AC voltage signals settings that supply the motor. The complex dynamic operating mode of the motor is given by cutting sequence process: the normal cutting sequence at constant line speed, to which is added the continuous speed changes required by the human operator or the line speed deceleration regime in the event of stop or breakdown conditions.

Paper 35

Dache Cristinel RADU, Silviu Ionut EPURE, Alexandru DUSA, Razvan Constantin SOLEA, Marian GAICEANU, Constantin DROGEANU - *The influence of the type of connection of the filter coils on the efficiency of the filtration process*

Abstract—Energy quality is an important factor today. To improve it, by reducing the disturbances and the deforming regime created by nonlinear loads, the best method is that of active filtration. In this paper is studied experimentally, the effect it can produce on the filtration process, the connection of the filter coils (with separate or common magnetic core) within an active prototype hybrid power filter.

Paper 40

Razvan BUHOSU, Marian GAICEANU, Razvan Constantin SOLEA, Iulian GHENEA , Marius George SOLOMON - *Non-linear control of 2WS vehicles*

Abstract—One of the most issue of the mobile robots is the Trajectory-tracking task. The authors of this paper present a solution of the problem through developed and numerically implemented of the nonlinear sliding-mode control with trajectory-tracking objective. The control is applied for a two wheel- steering vehicle (2WS). The effectiveness of the proposed control is demonstrated by provided simulation results.

TECHNICAL SESSION 4

TS4 - Automatic Control and Power Systems		Technical Session 4
Chair	Viorel MINZU Mariana DUMITRESCU	
Secretary	Iulian GHENEA	

Paper 20

Viorel MINZU, George Adrian IFRIM - *Optimal Control of Microalgae Growth in Artificially Lighted Photobioreactors Case study: closed-loop solution for a bilocal optimization problem*

Abstract — This paper states and solves a specific optimal control problem. The process refers to microalgae growth in Artificially Lighted Photobioreactors. There are many results concerning microalgae growth models, including the photobioreactor type used in this work. The paper describes a growth's dynamic model used in control problems and integrated into the bilocal optimal control problem, which this work addresses. The authors propose the Receding Horizon Control as the technique used to implement the closed-loop control structure. A simple method to calculate the optimal predictions is proposed and integrated into the optimal controller. The simulations proved that the approach is realistic and gives very good results.

Paper 28

Firat BILGIN, Musa ALCI - *Generating Z-number by Logistic Regression*

Abstract — L. Zadeh came up with the idea of Z-number to reflect human decision-making ability in environments where information is uncertain. According to his idea, a Z-number consists of a classical fuzzy part and its reliability. Although there are linguistic based studies exist in the literature, designing the reliability part is still an open issue. In this paper, Logistic Regression is used to determine reliability part. Since the reliability part contains probability information and fuzzy granular information, both statistical and probability based methods must be proposed. The features such as giving probabilistic output, being optimization based via a cost function makes the Logistic Regression one of the best methods for generating Z-number. According to the proposed method, Z-numbers and Z-number based fuzzy if-then rules are written. We tried the Z-number based classifier on Fisher Iris Dataset. The results showed us the more reliable fuzzy membership functions give the more accurate outputs as expected. Another important issue is the reliability of input information, i.e. sensor data, was not known, so the reliability based calculations could not be performed. The reliability of input data can be calculated via proposed method.

Paper 31

George PETREA, Viorel NICOLAU, Mihaela ANDREI - *On controller integration for electrostatic precipitator*

Abstract— Environment protection is a provocative task in any industrial business and many investments have been made for developing the best techniques in order to minimize pollution, in all its forms. Air dedusting is a main topic in steel industry and one of the solutions used is the electrostatic precipitator (ESP). This device is based on the idea of removing dust particles from a gas flow using electrostatic charge (corona effect). The energy is thus applied only to the particles, not to the gas resulting a very efficient process regarding energy consumption. In this paper a controller is proposed to be integrated in an automation system for controlling an electrostatic precipitator and all its auxiliary equipment.

Paper 21

Mariana DUMITRESCU - *Electric Power Supply Fault Tolerant Analysis for a Naval System*

Abstract— This paper presents an analysis for the fault tolerant system of the electric power supply naval, taking in consideration the electric power computer simulation and design technology. The main switchboards configuration alternatives are taken in consideration to increase the reliability by improving the fault tolerant aspects of power system in its functional stages. The paper points to the most fault tolerant alternative.

Paper 29

Daniel GANEA, Ciprian VLAD - *The potential of renewable energies in Romania*

Abstract — Context: Lately, we are witnesses of a major shift regarding the energy sector. Our society it is increasingly addictive to electricity, and it is forecast that this dependence will increase once fossil fuels will be abandonment in the road vehicle industry. Objective: The aim of this paper is to evaluate the capabilities of Romania energy sector and the sustainability of new investments in RES (renewable sources of energy) exploitation. More precisely, the wind power potential is evaluated in term of investment sustainability. Method: For this study, data coming from two databases were processed. The first one is the Romania National Energy System, while the second is European Centre for Medium-Range Weather Forecasts. The data coming from ECMWF relates to ERA5 project which is an atmospheric model. In addition, the sustainability of investing in wind energy was analysed based on several economical parameter. Results: The result of this study show that, for the investment to be sustainable, the capacity factor for an onshore wind turbine should be above 36%. Conclusions: Due to the pattern of wind power in Romania, it can be concluded that it is viable for new investments in this area in certain geographical locations. The sustainability is determined through economic and technical parameters associated with the concerned technologies.

TECHNICAL SESSION 5

TS5 - Electromagnetic Compatibility and Electrical Engineering Tools		Technical Session 5
Chair	Florin CIUPRINA	
	Florin CONSTANTINESCU	
Secretary	Mihaela ANDREI	

Paper 23

Laura ANDREI, Florin CIUPRINA, Elena Ruxandra RADU, Augusta Raluca GABOR, Denis Mihaela PANAITESCU - Dielectric performances of LSR-SiO₂ nanocomposites for wearable antennas substrate

Abstract — This paper studies the dielectric performances of liquid silicone rubber (LSR) and LSR-SiO₂ nanocomposites, in connection with dynamic mechanical analysis (DMA) results on these materials. The methodology used is based on measurements of the dielectric spectra of the real part of the complex permittivity and of the loss tangent for unfilled LSR and nanocomposite samples, in the ranges 10-2 – 106 Hz for frequency and 30 - 80 °C for the temperature. The main contribution refers to the temperature influence on the dielectric response of the tested materials. Finally, it was concluded on the suitability of the tested nanodielectrics as substrate for wearable microstrip antennas.

Paper 9

Valentin NAE, Iancu CIOCIOI, Gheorghe SAMOILESCU, Adelina Rodica BORDIANU - Electromagnetic compatibility of radiocommunication equipment on board a ship

Abstract — Ensuring the electromagnetic compatibility of radio communication equipment on board a merchant ship is an essential requirement for ensuring the safe navigation of the ship. This involves ensuring that the equipment is placed on board and that electromagnetic interference between them is reduced at least to the level of permissible interference. This study analyses the protection ratio, based on the recommendations of the International Telecommunication Union and the interference margin between three radio communication equipment on board a ship using ANSYS EMIT.

Paper 10

Adelina Rodica BORDIANU, Gheorghe SAMOILESCU, Iancu CIOCIOI, Valentin NAE - Electromagnetic shielding for the protection of the human factor on board a ship

Abstract — The naval ships are equipped with various electronic devices that generate electromagnetic fields. These fields may affect personnel on board ships. The role of electromagnetic shielding is to reduce the electromagnetic field in a space by blocking it with barriers made of conductive or magnetic materials. Given the complexity of the human body, the paper presents two means of protection against electromagnetic radiation – the protective curtain and the shielding suit. Using "COMSOL Multiphysics" different simulations were performed, and conclusions were drawn.

Paper 30

Ion VONCILA, Ion PARASCHIV, Madalin COSTIN - *The Influence of Saturation on the Performance of PMSM*

Abstract—The paper analyses the influence of the nonlinearity of the magnetic circuit (and, implicitly, the possibility of saturation) on the functional and performance characteristics of the permanent magnet synchronous machine (PMSM). The comparative analysis was performed between a PMSM anisotropic and linear, and a PMSM anisotropic and nonlinear, respectively, for the same control strategy, in the PSIM programming software. Based on the results obtained, at the end of the paper, conclusions were formulated for this class of motors and recommendations were done to mitigate the negative effects generated by the saturation of the magnetic circuit as a result of taking into account its nonlinearity.

Paper 33

Marian COSTEA, Tudor LEONIDA - *Radiofrequency Disturbances produced by Insulators Strings in wet Conditions*

Abstract - Checking the radio interference voltage (RIV) of high voltage equipment is one of the basic requirements for its acceptance in operation. The procedure for assessing the radiofrequency disturbance level of high-voltage equipment is well known and established by regulations elaborated by CISPR. Tests are performed in high-voltage shielded laboratories on equipment in dry conditions. The goal of the paper is the study of radiofrequency disturbances produced by insulators strings in different weather conditions including wet conditions (dew). The influence of moisture is obvious and must be taken in consideration when a complete characterization of equipment behaviour is of interest.

Paper 31

George PETREA, Viorel NICOLAU, Mihaela ANDREI - *On controller integration for electrostatic precipitator*

Abstract— Environment protection is a provocative task in any industrial business and many investments have been made for developing the best techniques in order to minimize pollution, in all its forms. Air dedusting is a main topic in steel industry and one of the solutions used is the electrostatic precipitator (ESP). This device is based on the idea of removing dust particles from a gas flow using electrostatic charge (corona effect). The energy is thus applied only to the particles, not to the gas resulting a very efficient process regarding energy consumption. In this paper a controller is proposed to be integrated in an automation system for controlling an electrostatic precipitator and all its auxiliary equipment.

TECHNICAL SESSION 6

TS6 - Power Systems and Software Engineering	Technical Session 6
Chair	Horia ANDREI Emil DIACONU
Secretary	Cristinel Radu DACHE

Paper 4

Horia ANDREI, Emil DIACONU, Andrei GHEORGHE, Marilena STANCULESCU, Radu PORUMB, George SERITAN, Paul ANDREI, Nicu BIZON, Alin MAZARE, Laurentiu IONESCU, Marian GAICEANU, Sorin DELEANU - *Energy Consumption, Pandemic Period and Online Academic Education: Case Studies in Romanian Universities*

Abstract — Objectively, electricity is the most important current power source and, especially, of the future. Electricity consumption in universities worldwide is achieved by installations and equipment both in laboratories, classrooms, applications, and sports, in the rooms of administrative staff, and campus. Depending on the specializations, each university has a specific footprint of electricity consumption. During the pandemic of 2020, the world introduced several measures to limit the spread of the Covid virus, including online education in academia. Thus, in terms of electricity consumption, universities recorded a decrease during the pandemic, but there was an increase in household consumption for teachers and students. The subject of this paper is a quantitative analysis of the data provided by four universities in Romania on electricity consumption recorded before and during the pandemic. These data are correlated with household electricity consumption for the same two time periods, which were collected from some teachers and students in a university. A percentage of the decrease respectively increase of these electricity consumptions is due to the use of computers in the university respectively at home. That is why the measurements performed on a personal computer connected to the Teams platform used in the online education system are presented and analyzed. All these data and comparative analyses are especially useful for any university in the country or worldwide.

Paper 6

Valentin ION, Horia ANDREI, Emil DIACONU, Dan PUCHIANU, Andrei Cosmin GHEORGHE - *Modelling the electrical characteristics of video surveillance systems*

Abstract — It is not possible to speak about a complete security system without also taking into account the video surveillance system (CCTV). The reason is that CCTV systems offer the most spectacular results both in the security of goods and people and in the field of customer relations, marketing, traffic monitoring and the list can go on. With the development of the software industry the applicability of CCTV systems has greatly increased, largely due to image processing applications. The present paper, which is the continuation of an article already presented at an international conference, aims to shape the electrical characteristics of a common video surveillance system. The proposed method will be validated in two different programming environments.

Paper 7

Valentin ION, Horia ANDREI, Emil DIACONU, Dan PUCHIANU, Mihaita Nicolae ARDELEANU - *Modelling of Electrical Characteristics for an Anti-Theft Alarm System*

Abstract — The need to increase the security of persons and goods alike has led to the transformation of security systems from luxury into necessity. This paper aims to analyse the electrical characteristics of the components of an alarm system. The system chosen for analysis is a common one, found in the vast majority of residential buildings in Romania, the choice being made on the basis of the over 14 years of experience that each of the authors have in the field of the security systems.

Paper 3

Ionut CRAIU, Emil Mihai DIACONU, Liviu OLTEANU, Simona MIHAI, Mihaita Nicolae ARDELEANU - *Study of the possibility of transferring thermal energy by conduction through a solid substance, in concentrated solar power systems*

Abstract — Concentrated solar power is a renewable resource exploitation area and involves a number of methods to capture and convert sunlight into electricity. One of the technical possibilities to achieve this consists in using parabolic surfaces to concentrate the solar energy onto one single spot. Usually, the energy captured by this method is transported by way of a thermal agent, a liquid substance in most cases. The purpose of this paper is to test the efficacy of using a solid substance to perform the heat transfer from the focal point on the parabolic surface to the opposite end where a Stirling engine will absorb the transferred energy. This efficacy was quantified through a specific coefficient that indicates the optimum length for the heat transfer.

Paper 14

Valentin ION, Horia ANDREI, Emil DIACONU, DAN PUCHIANU, Andrei Cosmin GHEORGHE - *Cost and energy consumption analysis of residential security systems*

Abstract — The authors of this article analyzed in previous papers, published in several international conferences, the behaviour of a residential security system consisting of anti-theft alarm and closed-circuit television system (CCTV) or otherwise known as video surveillance system. They also mathematically modelled the behavior of the components of the two security systems. This article concludes this study by conducting a cost analysis from the point of view of the beneficiary, taking into account the investment costs and those of subsequent operation (energy consumption, maintenance, consumables).