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**Abstracts
of the publications submitted for participation in the competition
for the academic position of Associate Professor
of Chief Assist. Prof. Velislava Hristova Raydovska, PhD**

▪ **Habilitation thesis – monograph**

B.3. Райдовска Велислава (2026). Възможности за обучение на студенти чрез симулационни изследвания в електротехниката в условия на пандемия: монография, Издателство: Марти - Дени груп, 2026, ISBN - 978-619-7207-32-3, COBISS.BG-ID – 77884936

EN: Opportunities for student training through simulation studies in electrical engineering under pandemic conditions

The monograph “Opportunities for Student Training through Simulation Studies in Electrical Engineering under Pandemic Conditions” is devoted to current problems and challenges in engineering education under the conditions of distance learning imposed by the COVID-19 pandemic. The possibilities for applying virtual software environments and simulation technologies in electrical engineering education are examined with the aim of maintaining the quality of the educational process and developing practical engineering skills. The monograph is the result of the author’s long-term teaching experience and includes developed and tested approaches implemented in a real educational environment.

The work presents an analysis of modern software environments and virtual laboratories used in engineering education, including NI Multisim, MatLab/Simulink, TINA-TI, OrCAD, LabVIEW, LTSpice, PhET, and Edison. Their functional capabilities, tools for modeling, analysis, and simulation of electrical and electronic circuits, as well as their application in electrical engineering and electronics education, are presented. The advantages of virtual experimentation for studying electrical circuits, transient processes, electronic devices, and measurement systems are also investigated.

The monograph contains numerous practical examples, tasks, and simulation studies demonstrating the application of virtual environments in solving electrical engineering problems. Models and algorithms in MatLab have been developed for calculating equivalent resistances, current and voltage distribution, analysis of complex electrical circuits, and transient processes. Examples are presented of using NI Multisim and TINA-TI for simulation of electrical circuits, measurement processes, and laboratory exercises.

Special attention is paid to the role of virtual laboratories as an intermediate stage between theoretical training and real experimentation. It is shown that the use of simulation technologies supports the understanding of complex electrical engineering processes, increases

student motivation, and creates conditions for safe experimentation without risk to students or laboratory equipment. The possibilities for self-study, project-based learning, and remote laboratory activities are also analyzed.

The monograph substantiates the necessity of integrating digital and simulation technologies into engineering education as part of the modern trends in digitization and modernization of higher education. A new educational approach is presented in which simulation-based investigation of electrical processes is introduced as an intermediate stage between theoretical learning and real laboratory practice. It is demonstrated that this approach improves student preparation, facilitates the understanding of complex engineering concepts, and increases the competitiveness of future engineers.

- **Published book based on a defended dissertation thesis for the award of the educational and scientific degree “Doctor (PhD)”.**

Г.6. Райдовска, Велислава (2025), Измерване на тангенса от ъгъла на диелектричните загуби на съоръжения в експлоатационни условия, Зеа-Принт ООД, Смолян, 2025, ISBN 978-619-196-177-1, 180 стр. COBISS.BG-ID – 77308680

EN: Investigation of possibilities for on-line monitoring of the tangent of the angle of dielectric losses of equipment

The book is based on the author’s dissertation thesis defended in 2015, entitled “Investigation of the Possibilities for Measuring the Tangent of the Dielectric Loss Angle $\tan(\delta)$ of Equipment under Operating Conditions”, submitted for the award of the educational and scientific degree “Doctor (PhD)”.

The book is devoted to the study and development of methods for diagnostics and continuous monitoring of the insulation condition of high-voltage electrical equipment through the measurement of the dielectric loss tangent $\tan(\delta)$. Attention is paid to transformer bushings, which are among the most frequent causes of failures in electric power systems. The processes of aging, moisture penetration, partial discharges, and other defects in insulation structures are analyzed, as well as their influence on the electrical characteristics and reliability of the equipment.

The book examines modern methods for technical diagnostics and operational insulation monitoring systems, including the possibilities for online monitoring without interrupting the operation of the equipment. The principles for designing diagnostic systems, measuring devices, and circuits for determining $\tan(\delta)$ and insulation capacitance under real operating conditions are presented. Different measuring configurations – direct, inverted, and reverse connection schemes – are analyzed together with their specific features when applied to high-voltage equipment.

The factors affecting the accuracy and reliability of diagnostics are studied in detail, including temperature, humidity, frequency, parasitic currents, interference currents, and measurement uncertainties. The mechanisms of polarization and electrical conductivity in dielectrics, the frequency and temperature dependences of $\tan(\delta)$, and the relationship between the variation of diagnostic parameters and the development of insulation defects are discussed. Analytical relationships, graphical interpretations, and criteria for evaluating the technical condition of insulation systems are presented.

The book proposes a methodology for continuous monitoring and processing of diagnostic information using a specialized software product for insulation condition monitoring. It is demonstrated that continuous monitoring of $\text{tg}(\delta)$ enables early detection of defects, prevention of failures, and improvement of the reliability and operational safety of high-voltage equipment.

The book is intended for specialists, lecturers, PhD students, and students in the fields of electrical engineering and power engineering.

▪ **Publications**

➤ **Scientific publications in journals and proceedings referenced and indexed in world scientific databases**

Г7.1. Shehova, D., Lyubomirov, S., **Raydovska, V.** (2018). Research and teaching of digitally programmable oscillators with modeling in TINA-TI environment application of open source. ICERI2018 (11th annual International Conference of Education, Research and Innovation), Seville (Spain), 12th-14th of November, pp. 5098-5105, ISBN:978-84-09-05948-5, ISSN:2340-1095, DOI:10.21125/iceri.2018.2167, 2018

The article presents the use of the TINA-TI software environment and the Arduino open-source platform for teaching and research of digitally programmable oscillators in engineering education.

Computer models of square-wave and triangular-wave generators with digitally controlled frequency using a digital-to-analog converter have been developed. Simulation and experimental studies were carried out using virtual measuring instruments, Arduino Mega 2560, and the Analog System Lab Kit PRO laboratory platform.

A comparison between theoretical, simulation, and experimental results has been made. It is shown that the combination of computer modeling and real hardware experiments supports the acquisition of engineering knowledge, develops practical skills, and improves the effectiveness of education in electronic circuits and devices.

Г7.2. Lyubomirov, S., Shehova, D., Asenov, S., **Raydovska, V.** (2019). Engineering Education and Examination of electronic circuits using MULTISIM. ICERI2019 (12th International Conference of Education, Research and Innovation), Seville, (Spain), 11th-13th of November 2019, pp.7079-7086, ISBN: 978-84-09-14755-7, ISSN: 2340-1095, doi:10.21125/iceri.2019.1680

The article discusses the use of the NI Multisim software platform for teaching and examination of linear electronic circuits in engineering education.

Computer-based simulation models of inverting and non-inverting analog summing amplifiers have been developed, enabling operation in different modes of summation of DC and AC signals. Virtual measuring instruments – oscilloscopes, multimeters, frequency meters, and measurement probes – are used for analyzing the parameters and characteristics of the signals. Simulation studies were carried out, and a comparison between theoretically calculated and experimentally obtained results was performed, including an evaluation of the relative error of the models.

It is shown that the use of computer-based models and virtual laboratory environments supports the understanding of engineering concepts, develops practical skills, and improves the training of students in electronic circuits and devices.

Г7.3. Asenov, S., **Raydovska, V.**, Lyubomirov, S., Shehova, D. (2019) Using of the NextCloud technology in the engineer education. ICERI2019 (12th annual International Conference of Education, Research and Innovation), Seville (Spain), 11th-13th of November, 2019, pp. 7087-7095, ISBN: 978-84-09-14755-7, ISSN: 2340-1095, doi: 10.21125/iceri.2019.1684

The article presents the implementation of Nextcloud cloud technology in engineering education with the aim of improving the organization of the educational process and the preparation of highly qualified engineering specialists.

Existing cloud technologies are analyzed, and the choice of Nextcloud as a platform for building a functional cloud server with minimal financial costs is justified. A structure of user groups – “Teachers”, “Staff”, and “Students” – has been developed, providing opportunities for file sharing, task management, video conferencing, and access control.

The hardware configuration of the system, the security mechanisms, and the possibilities for using the platform in the development of electrical circuits, graphics, projects, and software block diagrams are presented. It is shown that Nextcloud technology supports distance learning, improves communication efficiency, and creates conditions for practical training in engineering disciplines.

Г7.4. Daniela Shehova, Stanislav Asenov, Hristo Kanevski, **Velislava Raydovska**, Anatoliy Parushev, Implementation of an eco-friendly hybrid vehicle in engineering education: a case study, Ecologia Balkanica, 2025, vol. 17, issue 2, pp. 013-018, ISSN: 1313-9940 (online), ISSN: 1314-0213 (print), DOI: 10.69085/eb20252013. (Scopus, Web of Science, (Q4))

<https://eb.bio.uni-plovdiv.bg/wp-content/uploads/2025/10/eb20252013.pdf>

BG: Внедряване на екологично чист хибриден автомобил в инженерното образование: практически казус

The article presents the implementation of an eco-friendly hybrid vehicle as a laboratory platform in engineering education.

The study examines the use of a Toyota C-HR Hybrid 1.8 equipped with Hybrid Synergy Drive technology for conducting real measurements and analyses within the educational process.

The possibilities for student training through experimental investigations of energy efficiency, fuel consumption, emissions, and the operation of the electrical and electronic systems of the hybrid vehicles are analyzed. Methodologies for integrating ecological and energy-efficient technologies into automotive electronics and engineering education are presented.

It is shown that the use of a real hybrid vehicle as a laboratory platform enhances students' practical skills, improves the understanding of modern automotive technologies, and stimulates interest in sustainable transport and ecological engineering.

Г7.5. Stanislav Asenov, **Velislava Raydovska**, Daniela Shehova, Hristo Kanevski, Anatoliy Parushev, **Ecological aspects of DC-DC converters in hybrid electric vehicles – a review**, Ecologia Balkanica, 2025, vol. 17, issue 2, pp. 001-012, ISSN: 1313-9940 (online), ISSN: 1314-0213 (print), DOI: [10.69085/eb20252001](https://doi.org/10.69085/eb20252001). (Scopus, Web of Science, (Q4))
<https://eb.bio.uni-plovdiv.bg/wp-content/uploads/2025/10/eb20252001.pdf>

BG: Екологични аспекти на DC-DC преобразувателите в хибридните електрически превозни средства – обзор

The article presents a review of the ecological aspects of DC-DC converters used in hybrid electric vehicles. The role of the converters in managing the energy flow between battery systems, electric motors, and auxiliary electrical systems is analyzed.

Various DC-DC converter topologies, their energy characteristics, efficiency, and impact on the overall energy consumption and environmental performance of hybrid vehicles are discussed. Special attention is paid to the reduction of energy losses, electromagnetic interference, and thermal emissions, as well as to the application of modern semiconductor technologies for improving efficiency.

Trends in the development of highly efficient and environmentally sustainable power conversion systems in the transport sector are presented. It is shown that the optimization of DC-DC converters is significant for reducing harmful emissions and increasing the efficiency of hybrid electric vehicles.

➤ **Science articles in unrefereed journals with peer review or in edited collective volumes**

Г8.1. Райдовска В., Ж. Ставракев. Параметричен модел с повишена адекватност на поляризиращ се диелектричен материал. Доклад на Научна конференция "Смолян-1999", 12-14 юни 1999г., Смолян, ISBN 954-91073-1-0, ISSN 1313-9061 (print), с.79-83

EN: Parametric model with increased adequacy of a polarizing dielectric material.

The article presents a parametric model for investigating polarization processes in dielectric materials with increased adequacy.

The main characteristics of polarization are considered, and various equivalent circuits for describing the behavior of dielectrics under the influence of an electric field are analyzed.

A bridge measurement configuration for determining the model parameters is proposed, allowing more accurate evaluation of the electrical characteristics of the material. Analytical relationships between the circuit parameters and the physical properties of the dielectric are derived.

Г8.2. Райдовска В., А. Райдовска. Приложение на отрицателно съпротивление като линеализатор при измерване на температури. Доклад на Научна конференция "Смолян-1999", 12-14 юни 1999 г., Смолян, ISBN 954-91073-1-0, ISSN 1313-9061 (print), с.84-86

EN: Application of negative resistance as a linearizer in temperature measurement.

The article examines the application of negative resistance in thermistors for increasing temperature sensitivity in measuring circuits.

A bridge circuit for temperature measurement, including a thermistor with a negative temperature coefficient, is analyzed. Analytical relationships between voltage, resistance, and temperature variations are derived.

A method for linearizing the thermistor characteristic with negative resistance is presented, improving the accuracy and sensitivity of the measurement process.

Г8.3. Райдовска В., Ж. Ставракев. Адекватност на един тип модели на индуктивни бобини със загуби без ферромагнитна сърцевина. Доклад на Научна конференция "Смолян-2001", 23-24 юни 2001г., Смолян, ISBN 954-91073-4-5, ISSN 1313-9061 (print), с.85-92

EN: Adequacy of a type of models of inductive coils with losses without a ferromagnetic core.

The article investigates the adequacy of models of inductive coils with losses without a ferromagnetic core.

Different equivalent circuits describing the behavior of the coils under alternating current and various frequency conditions are analyzed.

The relationships between the active and reactive parameters of the model, as well as the influence of losses on the energy characteristics of the coil, are examined.

Criteria for evaluating the adequacy of the models are presented, and analytical relationships for determining the parameters of the equivalent circuits are derived.

Г8.4. Райдовска В. Триелементен модел на бобина без магнитопровод с повишена адекватност. Доклад на Научна конференция "Смолян-2001", 23-24 юни 2001г., Смолян, ISBN 954-91073-4-5, ISSN 1313-9061 (print), с.93-96

EN: Three-element model of a coil without magnetic core with improved adequacy.

The article presents a three-element model of a coil without a magnetic core with increased adequacy for describing electromagnetic processes under different frequency conditions.

The relationships between the active and reactive parameters of the model, as well as the influence of losses on the impedance characteristics of the coil, are analyzed.

The proposed equivalent circuit allows more accurate modeling of the behavior of real inductive elements over a wide frequency range. Analytical relationships for determining the model parameters are derived, and the possibility of experimental measurement using a bridge circuit is demonstrated.

Г8.5. Ставракев Ж., **В. Райдовска**, А. Кикьов. Измервателна уредба за специфични обемни и повърхностни съпротивления на диелектрици. Доклад на Научна конференция "Смолян-2002", 29-30 юни 2002г., Смолян, ISBN 954-91073-5-3, ISSN 1313-9061 (print), с.41-47

EN: Measuring device for specific volume and surface resistances of dielectrics.

The article presents a measuring device for determining the specific volume and surface resistances of dielectric materials. A bridge circuit based on a three-element model of a coil with an air magnetic core is analyzed, enabling improved accuracy and sensitivity of the measurements.

Analytical relationships for the bridge balance conditions and the influence of the parameters on the measurement process are derived. The complex characteristics of the circuit are examined, and the possibility of minimizing uncertainties in determining the electrical parameters of dielectric materials is demonstrated.

The results can be applied in the development of high-precision measuring systems and laboratory equipment.

Г8.6. **Райдовска В.** Анализ на мостова схема за измерване параметрите на триелементен модел на бобина с въздушен магнитопровод със загуби. Доклад на Научна конференция "Смолян-2002", 29-30 юни 2002г., Смолян, ISBN 954-91073-5-3, ISSN 1313-9061 (print), с. 34-40

EN: Analysis of a bridge circuit for measuring the parameters of a three-element model of an air-core coil with losses.

The article presents an analysis of a bridge circuit for measuring the parameters of a three-element model of an air-core coil with losses.

The bridge balance conditions and the influence of the active and reactive parameters on the measurement accuracy are examined.

Analytical relationships for determining the model parameters are derived, and the complex functions characterizing the behavior of the system are analyzed.

A methodology for minimizing uncertainties and improving sensitivity in the measurement of inductive elements is presented.

Г8.7. Сапарев Сл., В. Савова, **В. Райдовска**. Препоръки за определяне оптимумът на графичен модел построен с R-функции. Доклад на Научна конференция "Смолян-2003", 21-22 юни 2003г., Смолян, ISBN 954-91073-6-1, ISSN 1313-9061 (print), с.176-182

EN: Recommendations for determining the optimum of a graphical model constructed with R-functions.

The article presents recommendations for determining the optimum of graphical models constructed using R-functions.

Methods for describing and optimizing geometric objects through analytical relationships and functional transformations are considered. The conditions for symmetry and the constraints in constructing graphical models, as well as the influence of different parameters on the optimal solution, are analyzed.

Examples of applying the method to two-dimensional and three-dimensional geometric figures are presented.

The results can be applied in computer graphics, engineering modeling, and computer-aided design (CAD) systems.

Г8.8. Сапарев Сл., В. Райдовска. Приблизително определяне моментната честота при наслагване на два хармонични сигнала с близки честоти. Доклад на Научна конференция "Смолян-2004", 26-27 юни 2004г., Смолян, ISBN 954-91073-8-8, ISSN 1313-9061 (print), с.128-134

EN: Approximate determination of the instantaneous frequency in the superposition of two harmonic signals with close frequencies.

The article presents a method for approximate determination of the instantaneous frequency when two harmonic signals with close frequencies are superimposed.

The characteristics of the resulting beats and the influence of amplitude and phase relationships on the instantaneous frequency of the resultant signal are analyzed. The Hilbert transform and analytical relationships are used to derive expressions allowing real-time estimation of the instantaneous frequency.

The conditions for the applicability of the method and the accuracy of the obtained approximations are demonstrated.

The results can be found in applications in radio engineering, telecommunications, and digital signal processing systems.

Г8.9. Райдовска В.Хр. Измерване параметрите на триелементен модел на поляризиращ се диелектрик. Списание "Електротехника и електроника", бр.9-10, 2005г., ISSN 0861-4717, стр.51-53

EN: Measurement of the parameters of a three-element model of a polarizable dielectric.

The article proposes a method for measuring the parameters of a three-element model of a polarizing dielectric.

The model consists of two active and one reactive element connected in a parallel-series configuration, and its increased adequacy in describing processes in polarizing dielectrics is demonstrated.

A new version of a bridge circuit for measuring the model parameters is presented, using different power supply sources and a frequency-independent configuration. The bridge balance conditions are analyzed, and analytical relationships for determining the unknown parameters are derived.

The results obtained can be applied in the investigation and diagnostics of dielectric materials and electrical insulation systems.

Г8.10. Райдовска В.Хр. Изследване на параметрите на триелементен модел на линейна индуктивна бобина със загуби чрез мостова схема. Списание “Електротехника и електроника”, бр.11-12, 2005г., ISSN 086-14717, стр.63-68.

EN: Investigation of the parameters of a three-element model of a linear inductive coil with losses by means of a bridge circuit.

The article presents a study of the parameters of a three-element model of a linear inductive coil with losses using a bridge measuring circuit.

The model is of a series-parallel type and provides increased adequacy in describing real inductive elements. The bridge balance conditions are analyzed, and analytical relationships for determining the active and reactive parameters of the model are derived. Circular diagrams and the loci of their centers in the complex plane are examined for investigating the convergence and sensitivity of the measurement process.

An algorithm for bridge balancing using differential indicators is proposed.

The obtained results can be applied in the measurement and analysis of inductive coils and electromagnetic systems.

8.11. Райдовска В.Хр. Възможности за моделиране на изолационна конструкция на кабели. Доклад на Научна конференция с международно участие ”Смолян-2006”, 24-25 юни 2006г., Смолян, ISBN-10: 954-91877-1-3, ISBN-13:978-954-91877-1-7, с.83-91

EN: Possibilities for modeling the insulation structure of cables.

The article examines the possibilities for modeling the insulation structure of cables using three-element models of polarizing dielectrics.

Equivalent circuits for two-core and three-core cables are analyzed, enabling determination of the insulation parameters between the individual conductors and with respect to the screen. Analytical relationships between the measured impedances and the model parameters, as well as the conditions for symmetry and circuit transformations, are derived.

Methods for measurement and identification of cable insulation parameters using bridge circuits and impedance measurements are presented.

The obtained results can be applied in the diagnostics, design, and operational control of cable electrical insulation systems.

Г8.12. Абдулахов Хилми, **В Райдовска.** Работещ модел на йонизатор на въздух, ПУ „Паисий Хилендарски”, Научни трудове, том 39, кн.4, 2015 – физика, ISSN 0861-0029, 184-188 стр.

EN: Working model of an air ionizer.

The article presents a working model of an air ionizer based on corona discharge.

The physical principles of air ionization and the influence of negative ions on air quality and human health are examined. The electrical circuit of the device, including a high-voltage transformer, thyristor control, and a corona discharge generation system, is analyzed.

The construction of the prototype model is described, and the possibility of generating negative oxygen ions by means of an electric field is demonstrated.

The results obtained show the applicability of the device for air purification and ionization in residential and working environments.

Г8.13. Slavi Lyubomirov, **Velislava Raydovska**, Angel Chekichev and Milena Nedeva, The Software Platform for Security Alarm System, ANNUAL JOURNAL OF ELECTRONICS, 2015, ISSN 1314-0078, pp.100-103

The article presents a software platform for a security alarm system based on an Arduino Mega 2560 microcontroller and a GSM module for remote control and notification.

The main stages in selecting the software environment, programming language, and mobile platform for controlling the system are discussed.

The structure of the software is analyzed, including functions for automatic initialization of the GSM module, processing data from temperature sensors, and sending SMS notifications in the event of alarm conditions. A block diagram of the software platform and algorithms for the operation of the individual software modules are presented.

The operation of the system in a real environment is investigated, and its reliability, stability, and capability to compete with similar commercial solutions are demonstrated.

Г8.14. Chekichev, A., Shehova, D., **Raydovska, V.**, Hunev, Z. (2015). Computer Modeling of Transmitter of a Digital Communication System, Annual Journal of Electronics, XXIV International Scientific Conference, ELECTRONICS ET 2015, 15-17 September 2015, Sozopol, Volume 9, pp. 92-95, ISSN 1314-0078.

The article presents a computer model of the transmitter section of a digital communication system developed in the MATLAB/Simulink environment.

In digital information transmission, modern signal processing methods enable the creation of devices with functions inaccessible to analog signal processing techniques. The architecture of digital communication systems ensures efficient utilization of the spectrum and energy resources of the communication channel under continuously changing signal distribution conditions.

The aim of the paper is to provide a computer-based method for investigating the behavior of the transmitting part of a digital communication system based on a block diagram developed in the graphical simulation environment Simulink.

Г8.15. Raydovska Velislava, Peter Nakov, Testing methodology for continuous monitoring of insulation bushings by measuring $\text{tg}(\delta)$ on the model program in MatLab environment, International Journal of Engineering, Business and Enterprises Applications (IJEBEA), September-November 2015, Issue 14: Volume 1, ISSN (Online): 2279-0039, pp 1-6

The article presents a methodology for continuous monitoring of bushings by measuring the dielectric loss tangent $\text{tg}(\delta)$. A model of the measuring system has been developed in the MATLAB/Simulink environment, simulating the behavior of a real power system under complex voltage variations.

The methodology provides acquisition and processing of signals proportional to the voltage across the bushing and the current through the insulation, while Fourier transform is used for signal filtering and analysis. Various insulation deterioration conditions, including dynamic processes and partial breakdowns, are investigated.

An expert evaluation block for assessing the insulation condition based on the absolute value and the rate of change of $\text{tg}(\delta)$ has been developed.

The obtained results demonstrate the possibility for early diagnostics and improved reliability of insulation systems.

Г8.16. Chekichev, A., Lyubomirov, S., Shehova, D., Raydovska, V., Shotarova, S. (2016). Modeling of Communication Channel in the Simulink Environment, International Journal of Computer and Information Technology, pp. 483-486, ISSN: 2279 – 0764, Volume 05 – Issue 06, November 2016, Global Impact Factor (2015): 0.876

The article discusses the investigation of phenomena and processes in the communication channel of a digital communication system for data transmission using Matlab/Simulink.

The aim of the paper is to present a computer-based method for studying the behavior of the communication channel of a digital communication system through a block diagram created and simulated in the graphical simulation environment Simulink.

Г8.17. Шехова, Д., Любомиров, С., Чекичев, А., Райдовска, В., Шотарова, С. (2016). Симулационно изследване на линейни операционни схеми с използване на интегрирани среди за проектиране и анализ, II Национална Научна Конференция “Човекът и вселената”, Научни трудове на Съюза на учените в България - Смолян, Том II, стр.262-271 ISSN:1314-9490

EN: Simulation study of linear operational circuits using integrated design and analysis environments.

The article presents the results from the development and investigation of simulation models for studying linear operational circuits using analysis environments.

The proposed computer-based models for studying the parameters of linear operational circuits create an educational environment in which students' study, investigate, and analyze electronic devices in order to develop engineering skills for work under real-world conditions.

They provide new opportunities for organizing knowledge and new approaches to teaching and learning aimed at developing key competencies and achieving higher quality educational outcomes.

Г8.18. Райдовска Велислава Хр., Иван Масларов, Генератор на синусоидално напрежение със свръхниска честота. II Национална Научна Конференция “Човекът и вселената”, Научни трудове - СУБ Смолян, Том II ISSN:1314-9490, стр. 271-279

EN: Generator of sinusoidal voltage with ultra-low frequency.

The article proposes an operating principle and a structural diagram of a very low frequency sinusoidal voltage generator intended for testing high-voltage insulation systems.

The specific features of insulation testing at very low frequencies and the advantages of this method compared to conventional testing with power frequency and direct voltage have been analyzed. The disadvantages of static inverter generators are discussed, and an electromechanical solution based on a rotating transformer, stepper motor, and frequency control system is proposed.

The process of output voltage generation and higher harmonic filtering is investigated. It is shown that the proposed generator provides smooth and precise frequency regulation over a wide range, a sinusoidal output voltage waveform, and increased operational reliability.

The results obtained can be applied in testing cables and high-voltage insulation structures.

Г8.19. Райдовска, В., Любомиров, Сл., Шехова, Д., Чекичев, А. (2017). Микропроцесорна реализация на метеорологична станция в развойна среда Ардуино, Международна научна конференция „УНИТЕХ’17, 17-18 ноември 2017, Габрово, Избрани доклади, стр. I -110-115, ISSN 2603-378X

EN: microprocessor implementation of a meteorological station in the Arduino development environment

The meteorological station is designed and implemented on the basis of an Arduino Mega microprocessor board and a temperature and humidity sensor.

It is intended for educational purposes. The development includes the selection of the necessary hardware components (input/output board, display, sensors) for the implementation of the meteorological station, assembly of the used hardware, and software development for the operation of the meteorological station.

Г8.20. Шехова, Д., Райдовска, В., Любомиров, С., Асенов, С. (2017). Преподаване на програмируеми усилватели с моделиране в средата на „TINA-TI” и приложение на платформи с отворен код. Международна научна конференция “УНИТЕХ’17”, 17-18 ноември 2017, Габрово, Том IV, стр. IV-264-269, ISSN 1313-230X

EN: Teaching programmable amplifiers with modeling in the TINA-TI environment and application of open-source platforms.

The article proposes a methodology for simulation and physical investigation of digitally controlled amplifiers. A computer-based model of a programmable amplifier has been developed in the TINA-TI environment to support students in studying its parameters.

The results of the investigation are presented and analyzed.

The article emphasizes the possibility of using the TINA-TI software environment in the teaching of Analog Circuit Engineering to students in engineering specialties.

Г8.21. Raydovska, V., Luybomirov, S., Shehova, D. (2018). Functional Testing and Assembly of Modules of a Microprocessor Meteorological Station, Realized via the Arduino Development Environment, International Scientific Conference “Unitech’18”, 16-17 Nov. 2018, Gabrovo, pp.III- 142-147, Volume III, ISBN1313-230X

The development of a meteorological station and its implementation in the engineering education process allow engineering students to work with software development environments. They acquire the ability to develop specific sensor-based applications.

Fragments of the source code required for the operation of the selected sensors are included in the article. The Ethernet R3 module is used for real-time data transmission over a network. The source code for the software implementation of the module is also included. A real-time clock (RTC) based on the DS1307 integrated circuit is used for synchronizing data from the meteorological station.

Considering the capabilities of the processor and the integrated Arduino programming environment, it can be concluded that the device has good functionality and practical applicability.

The development demonstrates that it is possible to create a meteorological station operating with assembled microprocessor boards and sensors while providing reliable results.

Г8.22. Raydovska V. (2020) Teaching of unbalanced modes in three-phase electrical circuit using integrated environments for the design and analysis, Proceedings of ICERI2020 Conference 9th-10th November 2020, ISBN: 978-84-09-24232-0, pp-pp. 2673–2679 doi: 10.21125/iceri.2020.0620

The article presents the experience gained from online teaching of Electrical Engineering related to unbalanced operating modes in three-phase electrical circuits during the Covid-19 pandemic.

A teaching methodology based on the use of MatLab and NI Multisim software environments for the design, calculation, and simulation of three-phase systems has been developed. A program in the MatLab environment for calculating voltages, currents, and powers under different fault conditions and asymmetries in three-phase circuits is presented. Through virtual simulations in NI Multisim, students investigate the operation of electrical circuits, the influence of faults, and the characteristics of measurement processes.

The results from applying the methodology in the education of students in “Electrical Engineering” and “Measurements in Electrical Engineering and Electronics” are analyzed. It is shown that the use of virtual environments improves the understanding of electrical

processes, facilitates the acquisition of theoretical knowledge, and enhances the practical training of students.

Г8.23. Raydovska, V. (2021) Teaching of insulation constructions of the electrical devices via software environment, Proceedings of ICERI2021 Conference 8th-9th November 2021, ISBN: 978-84-09-34549-6 pp-pp. 1414-1419, doi: [10.21125/iceri.2021](https://doi.org/10.21125/iceri.2021)

The article presents a methodology for teaching insulation structures of electrical devices using specialized software environments and computer simulations.

The possibilities for visualization and analysis of electrical processes in the insulation systems of electrical engineering devices using virtual models are examined. Emphasis is placed on the application of software tools for investigating electric fields, dielectric losses, and the behavior of insulation materials under different operating conditions.

Examples of using simulations in the education of electrical engineering students are presented with the aim of improving the understanding of complex physical processes and enhancing practical training.

The results from the application of the methodology under distance learning conditions are analyzed, demonstrating that the use of virtual environments increases the effectiveness of education and students' interest in the discipline.

Г8.24. V. Raydovska (2023). Studying of the start-up process of wound rotor induction motors via virtual environments in the engineering education, INTED2023 Proceedings, ISBN: 978-84-09-49026-4, ISSN: 2340-1079, pp. 1878-1887. doi: [10.21125/inted.2023.0536](https://doi.org/10.21125/inted.2023.0536)

The article presents experience in teaching the starting modes of wound rotor induction motors using virtual environments and a specialized program developed in the MatLab environment.

Methods for limiting starting currents by connecting additional resistances in the rotor circuit and their influence on the mechanical characteristics of the motor are examined.

A program for calculating the values of starting resistances, currents, and characteristics of the starting process based on known analytical relationships has been developed. Algorithms for determining slip, torque, and starting currents under different operating conditions are presented.

The obtained results are visualized through graphs and tables, facilitating students' analysis of the processes.

The methodology has been successfully applied in the education of students in "Electrical Engineering" and "Power Supply and Electrical Equipment" under distance learning conditions during the Covid-19 pandemic. It is shown that the use of virtual environments improves the understanding of electromechanical processes and supports the practical training of future engineers.

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