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Dynamic Analysis of Transmission Power Systems with High Wind Power Integration under Severe Disturbances

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Dynamic Analysis of Transmission Power Systems with High Wind Power Integration under Severe Disturbances

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***Abstract*— This paper provides a comprehensive analysis of the impact of wind farm integration on the stability of an electrical power system, with a particular focus on the dynamic effects induced by wind power during severe system disturbances. The primary objective is to evaluate how wind power integration influences system behavior, particularly under fault conditions. The research utilized the IEEE 9-bus test system, which consists of three generators and nine buses, as a reference benchmark for the stability analysis. Simulations and modeling were performed using PSAT (Power System Analysis Toolbox), a robust tool for static, dynamic, and control analysis of power systems, integrated with Matlab. The study specifically investigated the effects of a three-phase short circuit, representing a significant system disturbance. The dynamic analysis was structured into three phases: pre-fault, fault, and post-fault, to capture the complete impact on system behavior. The results provided valuable insights into critical electrical and electromechanical variables, shedding light on the role of wind farms in maintaining the stability of the power grid, with particular emphasis on the transmission network's resilience and response to disturbances. This work offers a deeper understanding of the integration of renewable energy sources in enhancing grid stability during extreme events.**

Keywords—wind farm integration, power system stability, dynamic analysis

I. Introduction

The electrical power system is composed of various elements that exhibit different behaviors, often complex and nonlinear. To ensure system security, it is crucial to analyze its behavior and stability [1], especially under changing conditions. These dynamic phenomena can impact both operational costs and service quality. Studies help to better understand the conditions under which the power system can operate reliably, as well as the safety margins available. These technical aspects are essential to maintain a reliable and secure grid, whether for current operations, the integration of new components, or interconnection with other networks.

The system must not only operate under normal conditions but also withstand disturbances, whether they originate internally or externally. Dynamic studies are therefore vital for better network management and development planning. These dynamics may arise from electrical or mechanical processes, affecting both passive and active components of the grid. The most commonly analyzed disturbances include short circuits, load increases, generator losses, and line outages. These events will serve as the basis for our case studies. [2]

This paper addresses the concept of power system stability, with a classification based on two perspectives: on the one hand, according to its impact on electrical variables such as machine rotor angles, bus voltages, and system frequency; and on the other hand, based on the nature of the disturbance (steady-state, dynamic, or transient). Given that electrical energy cannot be stored in large quantities [3], system stability refers to the ability to continuously maintain the balance between power generation and consumption. After a disturbance, the system must be capable of resuming normal operation while keeping its variables within acceptable limits.

Analyzing stability requires accurate mathematical models that reliably represent the dynamic behavior of power system components and their interactions [4]. The most commonly used models in such studies include synchronous and asynchronous machines, primary generator control systems, on-load tap changers in power transformers, protection devices, and electrical loads [5], [6]. Primary control mechanisms mainly include frequency regulation (TG for Turbine Governor), voltage regulation (AVR for Automatic Voltage Regulator), and damping of power oscillations (PSS for Power System Stabilizer), which are implemented at the terminals of generators to respond effectively to disturbances [7], [8]. Under steady-state conditions, the mechanical power supplied by the turbine is balanced with the electrical power delivered by the generator. In the event of an imbalance between supply and demand, primary controllers play a crucial role in adjusting the machine's operating point.

The remaining sections of this paper are organized as follows: Section II provides a detailed explanation of the modelling and mathematical formulation of the system. Section III states the description of the test under study. Section IV outlines a complete discussion of the study of

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disturbances in the studied network. Section V analyses the results of simulations, performance and interpretations. Lastly, some conclusions and implications for future research are provided in the Section VI.

II. Modelling and Mathematical Formulation

A. Evaluation of Power Grid Stability

The most accurate method for evaluating transient stability is the numerical integration method (the classical method). This method allows for the inclusion of the dynamic features of generators and loads, speed and voltage regulation systems, advanced control systems as (FACTS, HVDC, PSS,...), and the consideration of protection circuit actions within the mathematical model. The mathematical model describing the dynamics of a system during and after a given disturbance is a set of first-order differential equations in the following general form:

$$\frac{dx}{dt} = f(x,u) \tag{1}$$

The most commonly used numerical methods for solving these systems are Runge-Kutta, Euler, and predictor-corrector techniques. Synchronous generators are considered the main source of energy production in electrical networks. In practice, transient stability studies focus on the dynamic analysis of the behavior of these machines following a disturbance. For a network with m generators, the differential equations that characterize the dynamics of the synchronous machine for the detailed two-axis model are expressed as follows:

$$\frac{2H_i}{\omega_s}\frac{d\omega_i}{dt} = P_{mi} - P_{ei} \tag{2}$$

$$\frac{d\gamma_i}{dt} = \omega_i - \omega_s \tag{3}$$

$$\frac{dE'_{qi}}{dt} = \frac{1}{T'_{doi}}\left(-E'_{qi} - (X_{di} - X'_{di})I_{di} + E_{fdi}\right) \tag{4}$$

$$\frac{dE'_{di}}{dt} = \frac{1}{T'_{qoi}}\left(-E'_{di} + (X_{qi} - X'_{qi})I_{qi}\right) \tag{5}$$

Where, $i = 1, \ldots \mathrm{m}$, and H is the rotor inertia constant of the synchronous machine. Eq. (2) is referred to as the swing equation.

B. Power Output of the Wind Turbine

In the turbine model with pitch angle (or blade angle) control, the turbine blades rotate in order to reduce the rotor speed under hyper-synchronous conditions. The mechanical power extracted from the wind (P_w) depends on the wind speed (w) and the rotor speed (V_w). It is given by the following equation: [9], [10]

$$P_w = \frac{1}{2}\,\rho\,\pi\,r^2\,V_w^3\,C_P \tag{6}$$

Where P_i is the total power output achieved considering wake effect in wind farm. ρ is the air density (kg/m³).

- r is the radius of the rotor (m).
- v_i is the wind speed at the turbine (m/s).
- C_P is the power coefficient, for commercial WTs, C_P =0.4.

The actual power output is regulated according to the available wind speed at any given time and location [11]. This regulation ensures that the turbine does not operate beyond its rated capacity or in unsuitable wind conditions, ensuring both efficiency and safety. The regulation is defined by specific expressions that take into account local wind conditions and operational limits, as stipulated by as follows: [9], [10]

$$P_w = \begin{cases} 0 & V_w < 3\,m/s \text{ and } V_w > 25\,m/s \\ P_w & 3\,m/s \le V_w < 12\,m/s \\ 1\,p.u & 12\,m/s \le V_w < 25\,m/s \end{cases} \tag{7}$$

III. Description of the Test System Under Study

The studied network was first modeled using a dedicated toolbox for power system analysis in MATLAB: the Power System Analysis Toolbox (PSAT) developed by [12]. PSAT enables various types of analysis, including power flow studies, stability assessments, and time-domain simulations of the electrical grid. PSAT includes standard models for key power system components such as transmission lines, transformers, circuit breakers, synchronous and asynchronous machines, as well as voltage regulators (AVR), frequency governors (TG), and power system stabilizers (PSS) associated with synchronous machines. It also supports the three main types of wind turbine models presented in this paper: the constant-speed wind turbine (CSWT), the doubly-fed induction generator (DFIG), and the variable-speed synchronous generator decoupled from the grid via a power electronic interface (DDSG). A wind model, used in stability studies, is also integrated. The time-domain simulations performed with PSAT allow the analysis of transient, mid-term, and long-term stability phenomena. These analyses help evaluate the system's stability limits under various operating scenarios, especially in the presence of high wind energy penetration, while complying with the operational constraints of grid equipment.

A key characteristic of modern power systems is their high level of interconnection. To reflect this feature while maintaining a simple topology for demonstration purposes, a classical meshed transmission network was selected for dynamic studies. This is the WSCC (Western System Coordinated Council) 9-bus system, consisting of 3 machines and 9 buses operating at 230 kV. It is widely used in the literature.

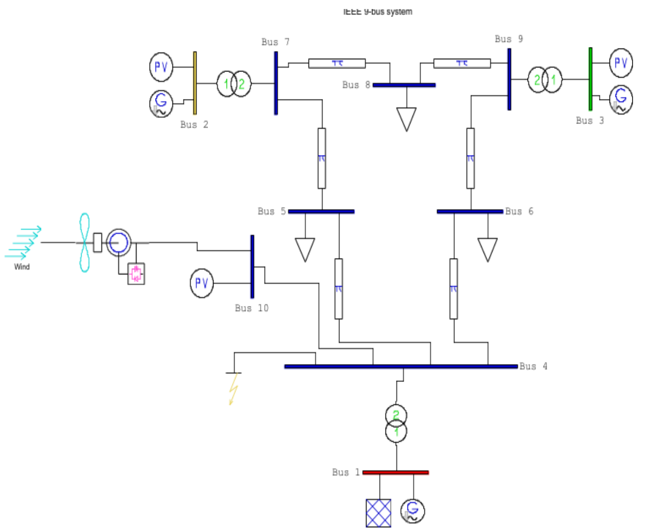

Fig. 1. Modified single-Line Diagram of the IEEE 9-Bus System

The system includes three major equivalent loads and three large synchronous generators connected to the grid. Despite its small size, the network exhibits sufficient complexity to allow the study of various scenarios, including those involving renewable energy sources. For the purpose of this study, the original system was modified by adding a wind farm at bus 4. The network configuration is shown in Fig. 1.

TABLE I. ELECTRICAL CONSTRAINTS OF THE NETWORK

Bus	The limits of the machines			
	Pmin [p.u.]	Pmax [p.u.]	Qmin [p.u.]	Qmax [p.u.]
1	0	2.00	-1.00	1.00
2	0	2.00	-0.30	0.70
3	0	2.00	-0.30	0.70

Line	Limits of the lines Pmax[p.u.]
1–4, 2–7, 3–9	2.00
1–4, 2–7, 3–9 8–2, 9–8, 9–4	100

Table I outlines the electrical constraints of the network under study, providing detailed parameters and limitations. Meanwhile, Fig. 2 visually depicts the wind speed distribution at the wind farm, offering a comprehensive view of the variability in wind conditions.

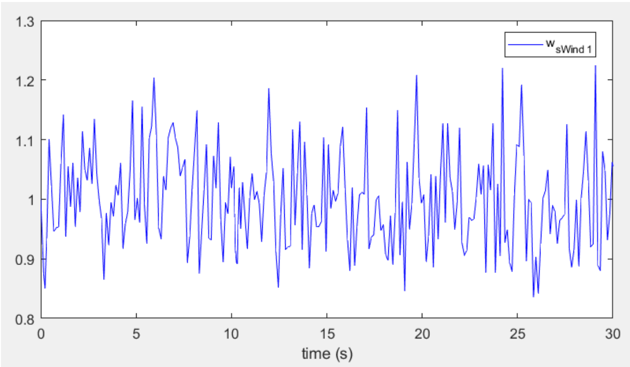

Fig. 2. Wind speed at the wind farm

IV. STUDY OF DISTURBANCES IN THE STUDIED NETWORK

A. Network Operation Under Fault Conditions

The analysis of network disturbances, specifically under short-circuit conditions, is critical for understanding the stability and performance of the electrical grid. During a three-phase short-circuit fault [13], [14], the system undergoes a significant disturbance that causes rapid changes in voltage and current levels, potentially leading to system instability[15], [16]. By simulating such conditions within the studied network, it becomes possible to analyze how different components, such as wind farms, respond to these disturbances. This simulation helps to evaluate the effectiveness of protective relays, control systems [17], and fault-tolerant mechanisms. Furthermore, it provides insights into the grid's resilience, particularly in handling faults, maintaining voltage stability, and ensuring that the system can quickly return to normal operation post-fault.

A three-phase short circuit occurs between buses 4 and 10, near the connection point of the wind farm. This fault takes place at t = 10 s and lasts for 150 ms, ending at t = 10.150 s. The circuit breakers located at the ends of the line, at buses 4 and 10, trip at that moment in accordance with the N-1 contingency criterion, isolating the faulty line. The wind farm must be capable of withstanding the voltage dip caused by this short circuit. It must also comply with the operating limits of the voltage-time curve under fault conditions to remain connected to the grid. Otherwise, it will automatically disconnect. During the fault, the minimum acceptable voltage is set at 0.25 p.u.

V. SIMULATION RESULTS AND INTERPRETATION

A. Scenario: The Three-Phase Short Circuit

A solid three-phase short circuit occurs at t = 10 s. The network topology evolves during the simulation through three states: before the fault (normal conditions), during the fault (fault conditions), and after the fault (with line disconnection). These topological changes impact the network's impedance matrix (Zbus).

1) Bus Voltages

Fig.4 shows the voltage distribution of all the buses.

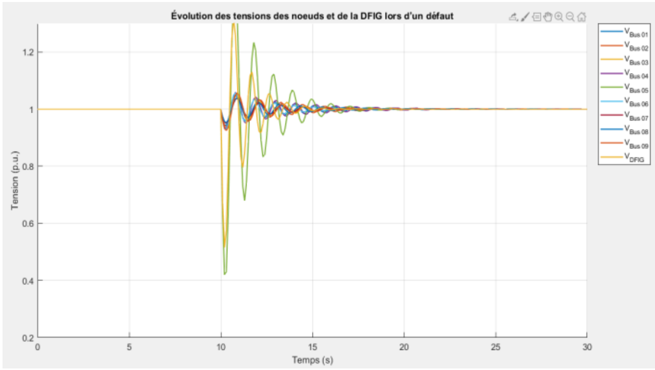

Fig. 3. Bus voltages

a) Before the Fault (t < 10 s):

All voltages are stable, between 0.99 and 1.04 p.u. (Fig. 3). The system is in a steady-state condition, well balanced. The system show no visible oscillations or unbalance.

b) During the fault (t = 10 s) :

- A sharp voltage drop is observed, especially at specific buses.
- The voltage at the faulted bus (likely Bus 04) drops to approximately 0.30 p.u., indicating a severe local disturbance.
- Voltages at other buses also drop, but less severely, depending on their proximity to the faulted bus.

c) After the fault (t > 10 s) :

- Voltages recover quickly but show transient oscillations.
- These oscillations are damped, indicating good dynamic stability.
- By t = 18–20 s, most buses return to values near the nominal voltage (≈1.0 p.u.).
- The fault is clearly localized, and its impact varies depending on the bus location relative to the fault point.
- The system shows good regulation capabilities, especially due to generators and automatic controllers (AVR, DFIG, etc.).

- The coordination between wind generation and synchronous machines contributes to rapid stabilization.
- The voltage at the DFIG bus drops more severely to ~0.3 p.u. at the moment of the fault.
- Thanks to its converter (vector control), it recovers more quickly than conventional buses.
- This behavior is typical of DFIGs, which inject reactive current to support local voltage during faults (Low Voltage Ride Through – LVRT).

2) *Active Power of the Generators:*

Fig.4 shows the distribution of active power injected by the various generation sources. The wind farm supplies an active power of 1.5 p.u., representing a 47% penetration rate relative to the total load. The synchronous machines located at buses 1, 2, and 3 inject 0.20 p.u., 0.80 p.u., and 0.80 p.u., respectively, representing 6.3%, 25.4%, and 25.4% of the total demand.

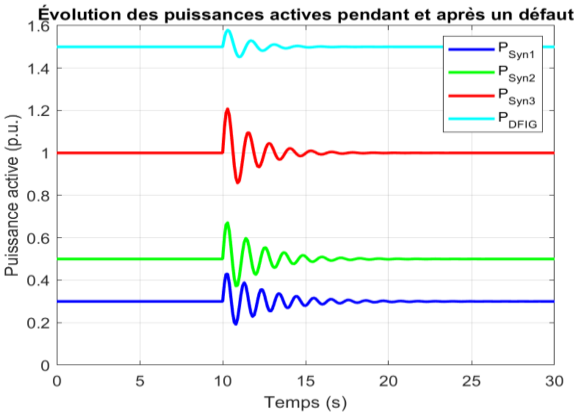

Fig. 4. Active power of the generators

a) Before the fault (t < 10 s) :

- All generators inject constant active power:

P_Syn1 = 0.3 p.u.

P_Syn2 = 0.5 p.u.

P_Syn3 = 1.0 p.u.

P_DFIG = 1.5 p.u.

- The system is in a stable steady-state condition, with no disturbances.

b) During the fault (t = 10 s) :

- A fault occurs at t = 10 s, causing a disturbance in the network.
- All power curves exhibit damped oscillatory transients:
  - This reflects the dynamic response of the machines to a voltage dip or system imbalance.
  - The oscillations differ in amplitude and duration depending on the generator type:

✓ Synchronous machines exhibit more pronounced and longer-lasting oscillations.

✓ The DFIG responds more quickly and stabilizes its output faster thanks to its power converter.

c) After the fault (t > 10 s):

- Active power levels gradually return to their initial values.
- The damping of the oscillations depends on the characteristics of each generator:
  - The return to equilibrium is slower for P_Syn3 (greater oscillation amplitude).
  - The system shows good transient stability, with no divergence.
- The studied electrical system demonstrates coherent dynamic behavior.
- The wind farm equipped with a DFIG contributes positively by quickly stabilizing its injected power.
- The quality of the transient response depends on the control strategy and tuning of each machine.

3) *Reactive Power of the Generators*

Fig. 5 shows the reactive power of the generators.

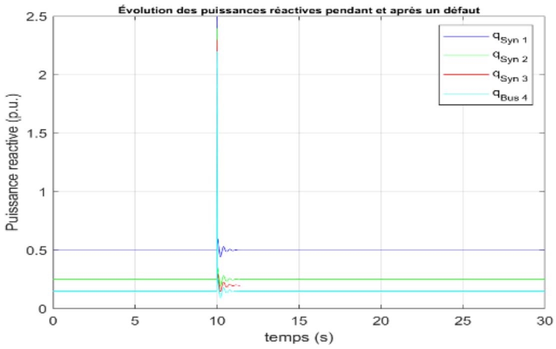

Fig. 5. Reactive power of the generators

a) Before the fault (t < 10 s):

Reactive power outputs are stable and constant, indicating a balanced steady-state operation. The typical values are:

- q_Syn1 ≈ 0.5 p.u.
- q_Syn2 ≈ 0.25 p.u.
- q_Syn3 ≈ 0.2 p.u.
- q_Bus4 ≈ 0.15 p.u.

This reflects nominal operation with balanced reactive power sharing between generators and loads.

b) During the fault (à t = 10 s)

A sharp spike in reactive power is observed across all signals:

- q_Syn1 reaches approximately 2.5 p.u.
- q_Syn2 ≈ 2.4 p.u.
- q_Syn3 ≈ 2.3 p.u.
- q_Bus4 ≈ 2.2 p.u.

- This jump is due to the severe voltage drop caused by the three-phase short circuit:

✓ Synchronous generators inject large amounts of reactive current to support local voltage through their excitation systems (AVRs).

- ✓ Bus 4, either near the fault or within the affected zone, shows a significant reactive power variation.

- The machines' behavior indicates their immediate contribution to reactive power compensation.

c) After the fault (t > 10 s):

- Damped transient oscillations appear in the reactive power signals:
  - ✓ Typical of dynamic stability and automatic regulation phenomena.
- Reactive power levels gradually return to their initial values:
  - ✓ q_Syn1 shows slight oscillations around 0.5 p.u.
  - ✓ q_Syn3 returns more slowly, suggesting either greater inertia or a closer topological location to the fault point.
- The system exhibits stable post-fault behavior thanks to:
  - ✓ Coordination of voltage regulators (AVRs),
  - ✓ Transient support from loads and generators,
  - ✓ A well-configured network control system.
- The IEEE 9-bus system with a fault at t = 10 s demonstrates good dynamic performance.
- Generators rapidly inject reactive power (Q) to compensate for the voltage drop.
- Bus 4, although affected, is not critical and follows a coherent trajectory: strong transient demand followed by a gradual return to equilibrium.
- This behavior is typical of well-regulated systems, with sufficient inertia, voltage control, and synchronization.
- To restore their electromagnetic torque, synchronous machines must absorb a large amount of reactive power to rebuild their magnetization (Fig. 5).

4) Frequency

Fig. 6 shows the rotational speeds of the synchronous machines (ω_Syn1, ω_Syn2, ω_Syn3) during and after a three-phase fault at t = 10 s on the IEEE 9-bus system.

a) After the fault (t < 10 s):

All three machines operate at a constant speed corresponding to 50 Hz:

- This indicates a synchronized steady-state regime.
- No imbalance is affecting the system.
- Rotor speeds are identical since the generators are synchronous and the network is balanced.

b) At the Moment of the Fault (t ≈ 10 s)

In this phase, the system shows a voltage drop and loss of electromagnetic torque.

- The three-phase fault causes a sudden voltage collapse across the buses, resulting in a sharp decrease in electromagnetic torque.
- The mechanical torque applied to the rotors remains constant, which leads to:
  - ✓ A transient rotor acceleration the speed momentarily exceeds 50 Hz.
  - ✓ For example: ω_Syn2 reaches approximately 50.22 Hz, ω_Syn3 around 50.15 Hz.

➢ Dynamic Divergence:

- The generators respond slightly differently depending on their location in the network:
  - ✓ Proximity to the fault location,
  - ✓ Excitation system settings,
  - ✓ Individual inertia.

This results in temporary divergence between speed curves, as evidenced by their separation.

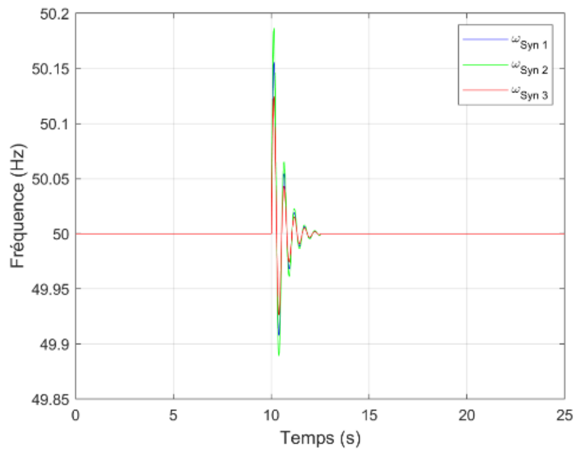

Fig. 6. Rotational speeds of the generators.

c) After the Fault is Cleared (t > 10 s)

Rotor Deceleration:

- Once the fault is cleared and voltage is restored:
  - ✓ The electromagnetic torque becomes greater than the mechanical torque.
  - ✓ This causes the rotor to decelerate, gradually returning to synchronous speed.

Damped Transient Oscillations:

- Typical electromechanical inertial oscillations are observed, which are well damped:
  - ✓ Oscillation frequency ≈ 1 Hz, characteristic of swing modes.
  - ✓ The system does not diverge, indicating good transient stability.
- Gradual damping continues until stabilization around 50 Hz by approximately t ≈ 18–20 s.
- The system shows stable behavior in response to a severe disturbance (three-phase fault).
- The transient response is characteristic of synchronous machines: acceleration → oscillation → resynchronization.
- Rotor speeds vary slightly depending on individual machine inertia and network position.

- This speed profile confirms good coordination between mechanical regulation (turbine-governor) and excitation system (AVR).

VI. Conclusion

This paper presented a dynamic analysis of a modified IEEE 9-bus transmission system integrating a DFIG-based wind farm, with particular emphasis on its response to a severe three-phase short-circuit disturbance. Time-domain simulations conducted using PSAT allowed the examination of key variables such as bus voltages, generator active and reactive power, and the electromechanical behavior of synchronous machines across the pre-fault, fault, and post-fault stages. The results show that the system remains dynamically stable despite the high penetration of wind power. The DFIG contributes to voltage support during the disturbance through its fast converter-based control, which enables a rapid recovery of electrical variables. Synchronous generators exhibit transient oscillations characteristic of electromechanical dynamics, yet they successfully resynchronize after fault clearance, indicating adequate damping and coordination with the wind farm. Overall, the study highlights that the integration of wind power, when supported by appropriate control mechanisms, does not degrade the transient performance of the network under severe disturbances. Instead, it can contribute to maintaining acceptable operating conditions and assisting voltage recovery. Future work will consider extended scenarios, including quantitative stability indices, comparisons with systems lacking wind generation, and the incorporation of energy storage and demand-response strategies to further enhance grid resilience.

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Moufdi Hadjab	Badreddine Babes	Nadjim Alti	
Abdelmalik Zorig	Khatir Khettab	Arif Bourezami	
Salim Djeriou	Loutfi Benyettou,		
Hani Benguesmia	Hilal Rahali		

The 2025 International Conference of Advanced Technology in Electronic and Electrical Engineering (ICATEEE)

December 10 – 11, 2025

M'Sila, Algeria

ICATEEE 2025

KEYNOTE SPEAKER

SPEECH TITLE:

Securing the Invisible: Fortifying Critical National Infrastructure in the IoT Age

BIOGRAPHY:

Dr Mohamed Chahine Ghanem

Director of the Cyber Security Research

Centre/ London Metropolitan University

m.ghanem@londonmet.ac.uk

Dr Mohamed Chahine Ghanem is an Associate Professor and Director of the Cyber Security Research Centre/ London Metropolitan University, Associate Professor in Cyber Security within the Department of Computer Science at the University of Liverpool, and Industry Advisor in Cyber Resilience. Before joining Academia, Dr Ghanem earned solid industry experience with over 20 years of practice in mid-senior positions in Law enforcement and corporations mainly acting as Principal Cyber Investigator and Director for Cyber Risk. Dr Ghanem holds an Engineering Degree in Computer Systems, an MSc in Digital Forensics & IT Security and a PhD in Cyber Security Engineering from the City, University of London. Dr Ghanem is a Senior Fellow of HEA (SFHEA) and holds a PGCert in Academic Practice and a PGDip in Security Studies and earned many reputable certificates such as CISSP, CPCI, multi-GIAC certificate GCFE, GICSP, GWAPT, GDSA, GCED, GWEB and Digital Forensics ACE & XRY. Dr Ghanem is currently leading the research in applied AI for Cyber Security and Digital Forensics and supervising research students on topics related to digital forensics, IoT, offensive cyber security and applied AI and published numerous research papers in top journals. Dr Ghanem is an Academic Editor for ACM Digital Threats: Research and Practice journal and Member of UK EPSRC Peer Review College.

KEYNOTE SPEAKER

SPEECH TITLE: AI-Driven Digital Twin and Vision-Language Models for Climate-Resilient Smart Agriculture Systems

Dr Zool Hilmi Ismail

Deputy Director, Centre of Artificial Intelligence and Robotics, Universiti Teknologi Malaysia

zool@ieee.my

BIOGRAPHY:

Dr. Zool Hilmi Ismail currently works as an Associate Professor and a research member of the Malaysia-Japan International Institute of Technology and Centre for Artificial Intelligence and Robotics (CAIRO). He was awarded a SEARCA Regional Professorial Chair Grant for AY 2021-2022 in recognition of his contributions to agricultural technology.

AP. Ir. Dr. Zool Hilmi Ismail received his B.Eng and M.Eng degrees in Mechatronics Engineering from UTM, Skudai, Johor, Malaysia, in 2005 and 2007, respectively. After graduation, he worked as a tutor at Universiti Teknologi Malaysia (UTM), one of Malaysia's leading research universities. AP. Ir. Dr. Zool Hilmi started as a Senior Lecturer in 2011 after completing his Ph.D. from Heriot-Watt University, Edinburgh, United Kingdom. His role in UTM is not only as an educator but also as a researcher. His main research interest is in the control of autonomous systems, robot motion planning, and coordination, along with applied combinatorial optimization. AP. Ir. Dr. Zool Hilmi Ismail has published 81 journal papers and two book chapters in the past five years. He also obtained two Industrial Designs in "Active Floating Sensor Module and Duct Inspection Robot.

The 2025 International Conference of Advanced Technology in Electronic and Electrical Engineering (ICATEEE)

December 10 – 11, 2025
M'sila, Algeria

KEYNOTE SPEAKER

Prof. Mohamed Fouad BENKHORIS

Directeur-adjoint Polytech Nantes

Enseignant-chercheur

Mohamed-Fouad.Benkhoris@univ-nantes.fr

SPEECH TITLE:

Dynamic Modeling of Multi-Phase Synchronous Machines for Control Design and Analysis

BIOGRAPHY:

Mohamed Fouad Benkhoris was born in Bou-Saada, Algeria. He earned the following degrees:

In 1986: An Engineering Diploma from the National Polytechnic School of Algiers, with a specialization in Electrical Engineering.
In 1987: A DEA (Diplôme d'Études Approfondies) from INPL Nancy, with a specialization in Electrical Metrology and Automatic Control.
In 1991: A Ph.D. from INPL Nancy (GREEN Laboratory), with a specialization in Electrical Engineering.
In 2004: An HDR (Habilitation à Diriger des Recherches) from the University of Nantes, with a specialization in Electronics and Electrical Engineering.
Since 2000, he has been conducting his research at the IREENA laboratory in the fields of traction and energy generation. His work focuses on the dynamic modeling and control of fault-tolerant power conversion architectures that incorporate multiphase machines. These investigations are driven by the goal of developing conceptual and methodological tools for dynamic modeling, numerical simulation, design, and control of innovative, fault-tolerant converter-machine assemblies. This work, which adopts a system-level approach, ranges from fundamental research to industrial applications. The target applications are electric propulsion - particularly for ships - onboard or islanded electrical grids, and the harnessing of marine renewable energies, from energy production to storage.

The 2025 International Conference of Advanced Technology in Electronic and Electrical Engineering (ICATEEE)

December 10 – 11, 2025
M'sila, Algeria

KEYNOTE SPEAKER

Dr. Amira Ouerfelli

IEEE IAS WIE Region 8 Representative ENIT Tunisia

SPEECH TITLE:

Igniting Innovation and Inclusivity: Leveraging the Dual Power of IEEE WIE and Entrepreneurship

BIOGRAPHY:

Amira Ouerfelli is an electrical engineer specialized in robotics, embedded systems, and AI, holding a master's degree in Information System Technologies from ENIT. Passionate about creating sustainable impact through technology, she has been active in IEEE since 2021 and currently serves as IEEE SIGHT Tunisia Section Chair, Humanitarian Technologies Coordinator for Tunisia Section, and an IEEE Smart Village volunteer since 2022. She also co-chairs the Implementation Committee for Education at Smart Village Global.

Amira mentors engineers through IEEE Entrepreneurship and leads initiatives in branding, communication, and global energy dialogue. She has been recognized for her leadership, including the Best Performance Sustainable Project Award at IEEE PowerAfrica 2024. She also mentors young professionals in humanitarian programs and contributes to education equity through a pilot program with the ISV Education Committee, while serving as IAS WIE Region 8 Representative.

Beyond IEEE, Amira chairs the Catastrophe Prevention and Management Team at the Tunisian Red Crescent, focusing on disaster risk reduction and community resilience. Her work at the intersection of technology, sustainability, and service continues to drive meaningful change.

ICATEEE2025 PROGRAM

Wednesday, December 10, 2025	
07:30 - 08:45	**Reception & Conference Registration**
08:45 - 09:45	**Opening Ceremony** **Pr. Ghadbane Ismail, General Chair.** **Dr. Abdelkader DJERAD, Dean of the Faculty of Technology, University of M'Sila.** **Pr. BOUDELAA Amar, Rector of the University of M'Sila.** **Pr . SELLAMI Mokhtar , CNRST, Algérie** **Pr . Attalah bilal , Vice chair IEEE Algeria section**
09:45 - 10:30	**Chair: Prof. Barkat said , Pr. Iratni Abdelhamid , Pr.Messalti Sabir , Pr. Benkhoris Mohamed Fouad** **Keynote speech 2:** AI-Driven Digital Twin and Vision-Language Models for Climate-Resilient Smart Agriculture Systems **Speaker: Prof. Zool Hilmi Ismail**
10:30 - 11:00	**Chair: Prof. Barkat said , Pr. Iratni Abdelhamid , Pr.Messalti Sabir , Pr.Benkhoris Mohamed Fouad** **Keynote speech 1:** Igniting Innovation and Inclusivity: Leveraging the Dual Power of IEEE WIE and Entrepreneurship **Speaker :** Dr. Amira Ouerfelli IEEE IAS WIE Region 8 Representative IEEE Tunisia section
11:00 - 11:15	**Coffee Break**
11:15 - 12:30	**Chair: Pr. Attalah bilal , Pr. Youcef brik , Pr. Iratni Abdelhamid , Pr. Drid Said** **Keynote speech 3: Prof. Mohamed Chahine Ghanem** **Speaker:** Securing the Invisible: Fortifying Critical National Infrastructure in the IoT Age

12:45 - 14:00	Lunch Break

14:00 - 16:00	Oral Sessions

SESSION 1 Wednesday 14:00 – 16:00	Electronics, Telecommunications and signal processing — ROOM 1
	Chairs: Pr. Bouras Mounir , Pr.Messaoud garah and Pr. Houcine Oudira , Dr. Benyounes abdelhafid
	Authors and titles
14:00 – 14:20 (Paper 67)	Authors: rania saoudi Djamel Eddine Boudechiche, Zoubeida Messali Title : Joint Demosaicing, Denoising, and Super Resolution for Wireless Capsule Endoscopy Images
14:20 – 14:40 (Paper 107)	**Authors: Authors:** Ziyad Younsi, Meddour Fayçal, Hichem Bencherif **Title:** Numerical Investigation of Interfacial Defects, BSF Layer, and Parasitic Resistances in CBTSSe Thin Film Solar Cells Using SCAPS-1D
14:40 – 15:00 (Paper 44)	**Authors:** Souhila Benmansour, Fethi Demim, Aimen Abdelhak Messaoui, Yamina Aouimer, Ali Zakaria Messaoui, Abdenebi Rouigueb **Title:** Integrated Fuzzy Logic and RRT-Based Optimal Trajectory Planning with Metaheuristic.
15:00 – 15:20 (Paper 87)	**Authors:** Djamal Haimoune,Boumediene Guenad,Hadj Ali Bakir,Ali Zidour **Title**: Design and Analysis of a Miniaturized Multi-Band Ultra-Wideband Microstrip Patch Antenna for 5G
15:20 – 15:40 (Paper 81)	**Authors:** Telia Azzedine, Meziani Abdelhakim **Title:** Comparative Study of Electrical Characteristics in MgZnO/ZnO and AlGaN/GaN HEMTs
15:40 – 16:00 (Paper45)	**Authors**: Fethi Demim, Aimen Abdelhak Messaoui, Souhila Benmansour, Zakaria Messaoui, Yamina Aouimer, Abdenebi Rouigueb, Ouail Moumeni, Title: Development of a 3D Simultaneous Localization and Mapping System for Unmanned Aerial Vehicle Navigation

SESSION 1 Wednesday 14:00 – 16:00	Electronics, Telecommunications and signal processing — ROOM 2
	Chairs: Pr. Mezache Amar , Pr. Ouali Mohamed Assam , Pr. Mohamed Djrioui
	Authors and titles
14:00 – 14:20 (Paper 72)	**Authors**: Maroua ARAB, Rabah LOUALI, Atmane KHELLAL, Aimen Abdelhak MESSAOUI, Hadjira BELAIDI, Mehrez BOULAHMAR, Billel NEBILI, Fethi DEMIM **Title**: A Novel RGB Image Dataset for Road Obstruction Level Classification in Catastrophe Scenarios
14:20 – 14:40 (Paper 122)	**Authors:** Zakariaou Mounmie, Yacine Yaddaden, Abdenour Bouzouane **Title : A** Hybrid Deep Learning Pipeline for Melanoma Detection Using Modified U-Net and VGG-19 Features
14:40 – 15:00 (Paper 178)	Authors: Choumeyssa CHENNOUF,Idris MESSAOUDENE,Massinissa BELAZZOUG,Youcef BRAHAM CHAOUCHE,Aicha GHERBI,Boualem HAMMACHE,Salem TITOUNI Title (ID178): Enhanced Isolation in CDRA Massive MIMO Arrays Using Alternating Slot Orientation Rotation (ASOR)
15:00 – 15:20 (Paper 40)	**Authors**: Imam Abderrahmane, Rahmi Bachir, Makdour Mansour, Badaoui Hadjira, Abri Mehadji, Bensalah Hocine, Wahiba Menasri, Abdennour Fellag Chebra, Abderrezak Gacemi **Title**(ID40): A Dual-Mode Plasmonic Filter Based on Bow-Tie Resonator for Optical Communication

15:20 – 15:40 (Paper 60)	**Authors:** Salah Khennouf, Adil Bakri **Title :** Recognition for Access Control: A Comparative Analysis of MFCC and PLP Features using CNN-Based Classification
15:40 – 16:00 (Paper 48)	**Authors:** Raouf Amrane, Youcef Brik, Abdelouadoud LOUKRIZ, Taha Housseyn Nouibat **Title(ID48):** Cascaded Integrator Comb Filters with Performance Enhancement through Sampling Rate Optimization

SESSION 1 Wednesday 14:00 – 16:20	**Electrical engineering and renewable Energy** **ROOM 3**
	Chairs: Prof. Kaddour Djamel , Dr. Zorig Abdelmalik , Dr. Bouzidi Riad , Pr.Hani Bengeusmia
	Authors and titles
14:00 – 14:20 (paper 197)	**Authors:** Choug Noreddine ,Fegriche Abderrahmane **Title:** Intelligent Approach for Direct Torque Control of DFIM: Fuzzy Regulation with Self-Adaptive Gain.
14:20 – 14:40 (Paper 41)	**Authors:** Ayyoub Zeghlache, Hemza Mekki, Ali Djerioui, Abdelmoumin Ouali **Title:** Comparative Analysis of Conventional and Improved QPLL for PMSM Speed Control Under Sensor Fault
14:40 – 15:00 (Paper115)	**Authors**: Abdelmoumin Ouali , Djalal Eddine Khodja , Hassina Megherbi , Khaled Benzaoui , Tahar Nouaoui , Ayyoub Zeghlache **Title(ID115):** Enhancement of Field Oriented Control for PMSM Based on Fractional Order PID
15:00 – 15:20 (Paper102)	**Authors:** Tahar Nouaoui, Abdelhakim Dendouga, Abdelmalik Bendaikha, Abdelmoumin Ouali **Title(ID102):** Robust Speed Control of PMSM using a Fractional Order Two Degree of Freedom PI Controller
15:20 – 15:40 (Paper217)	**Authors:** Yassine Mahamdi, Abdelouahab Mekhaldi, Ahmed Boubakeur, And Youcef Benmahamed **Title: T**owards Reliable Transformer Fault Diagnosis: A BPSO-Optimized DGA Interpretation Framework
15:40 – 16:00 (Paper35)	**Authors:** Bdelouadoud Loukriz, Ahmed Bendib, Abderrahim Zemmit, Moadh Kichene, Mohamed Dahmani ,Zine El-Abidine Dahmane **Title:** Innovative Physical Reconfiguration of PV Arrays for Enhanced Power Output under Partial Shading Conditions
16:00 – 16:20 (Paper51)	**Authors : Khaled Benzaoui, Abdelmoumin Ouali, smail Ghadbane** **Title (ID51):** DSIG within a wind turbine system-based high order sliding mode control

15:00 - 17:40	Virtual Sessions

SESSION 2 Wednesday 15:00 – 17:20	**Electrical engineering and renewable Energy** **ROOM 1** **Chairs: Prof. Guichi Omar , Dr. Zemmit Abderrahim , Pr.Khatir Khettab, Dr.Rouabhi Riyadh.** **Authors and titles** **Link :** https://meet.google.com/myr-qpxs-pay
15:00 – 15:20 (Paper 167)	**Authors: ABOUCHABANA Nabil, BENMILOUD Mohammed, AMEUR Khaled, HADJAISSA Aboubakeur, ZORIG Abdelmalik, BENFARHAT Sara** **Title:** A Low-Cost IoT-Based Smart Weather Station for Real-Time Environmental Monitoring.
15:20 – 15:40 (Paper *219)*	**Authors**: **Mohammed Yassine Dennai, Hamza Tedjini** **Title:** Enhancing Grid Resilience and Sustainability: A Solar-Powered Electric Vehicle Charging Station with G2V
15:40 – 16:00 (Paper 109)	**Authors: Mohammed BENMILOUD, Khaled AMEUR, Aboubakeur HADJAISSA** **Title:** Optimal DC Bus Voltage Regulation for Solar Microinverters: Experimental Validation
16:00 – 16:20 (Paper 70)	**Authors: SALHI, Fatma Zohra; MEHAOUCHI, Azeddine; ZIOUD, Mohammed Messaoud; DLILI, Mohammed Taha; BOUZIDI, Mansour.** **Title:** Predictive Direct Power Control of a Three-Level Grid-Connected Converter With DC-Link Capacitor Voltage
16:20 – 16:40 (Paper 206)	**Authors**: **Shehwar Tanveer1, Aqsa Ashfaq1, Savaira Nadeem1,Muhammad Asad1, Sadia Ali1 and Adil Farooq** **Title(ID206):** Smart Brain-Controlled Prosthetic Leg for Enhanced Mobility of Disabled Persons
16:40 – 17:00 (Paper 141)	**Authors**: **Adil Farooq, Tadhg Joseph Creagh, Eoghan Patrick Mooney, Conrad Attard, Peter Redmond** **Title(ID141**): ClusterBot: An Innovative Strategy Introduced in the IEEE R8 Robotics Championship 2024
17:00 – 17:20 (Paper 179)	**Authors: Sahibzada Muhammad Ali, Mansoor Iqbal, Adil Farooq, Muhammad Abbas.** **Title(ID 179): AI for Energy Equity: Bridging the Gap Between Sustainability and Accessibility**

SESSION 2 Wednesday 15:00 – 17:40	**Electronics, Telecommunications and signal processing** **ROOM 2** **Chairs: Dr. Moufdi hadjab , Pr.Slimane Benmahmoud , Dr.Salah Khennouf , Djalab Abdelhakim** **Link :** https://meet.google.com/npp-evkw-psz **Authors and titles**
15:00 – 15:20 (Paper 88)	**Authors: Marouane Chetioui , Babesse Saad ,Bouchikhi Nasreddine.** **Title :** Generalizable Conditional Imitation Learning for Urban Driving: A Multimodal ConvLSTM Approach in Adverse
15:20 – 15:40 (Paper 84)	**Authors**: **Karima Bencherif, Mohammed Titaouine, Awatef Djouimaa, Asma Bounouara, Ibtissem Adoui** **Title**: Analysis of Multiband Adjusted and Gain Enhenced Microstrip Antennas

15:40 – 16:00 (Paper 230)	**Authors: Messaoud Babaghayou, Fatima Zahra Zaoui** **Title:** Optimizing End-to-End Delay, Energy Consumption, and Task Success in Satellite-Based Edge Computing for Smart Farming in Isolated Environments
16:00 – 16:20 (Paper 152)	Authors: **Istighfar Chettih , Fatima Chouireb, Saadi Achour, Khalil Mokhtari** Benchmarking Scan-Matching and Scan-Context for 3D Outdoor LiDAR Graph-SLAM
16:20 – 16:40 (Paper 129)	**Authors: Mahdi Baccar, Yacine Yaddaden, Raef Cherif** **Title**: brid Deep Learning and Multiclass SVM Approach for Alzheimer's Disease Stage Classification from MRI Scans
16:40 – 17:00 (Paper 200)	**Authors: Abdelmalek Bengheni** **Title** : ASI-MAC : An Adaptive Sleep Interval MAC protocol for energy harvesting WSNs
17:00 – 17:20 (Paper 124)	**Authors: Zaki Aissam Khezzar ,Redha Benzid and Elhadi KENANE** **Title:** Transform-based algorithms dedicated to ECG baseline drift cancellation: A comparative study
17:20 – 17.40 (Paper 37)	**Authors: ABDELLATIF BENDALI, Hadjira Badaoui, Bachir Rahmi, Abderrahmane Imam, Mehadji Abri** **Title: Proposal for a novel 4×2 encoder structure based on linear photonic crystal ring resonators**
SESSION 2 Wednesday 15:00 – 17:20	**Electronics, Electrical engineering** **ROOM 3**
	Chairs: Prof. Salim Djriou , Dr.Mourad Naidji, Dr. Assam Zorig , Dr. Khaled belhouchet **Link :** https://meet.google.com/bae-ptpo-vbo
	Authors and titles
15:00 – 15:20 (Paper 59)	**Authors: Salim Hamouda, Abderrahim Hamli , Samir Hamdani , Hamid Khelfi** **Title**: Comparison of Parallel and Iterative CORDIC Architectures for Sine and Cosine Computation on FPGA
15:20 – 15:40 (Paper 13)	**Authors: Hadjer CHABAN, Ilyes TEGANI, Hamza AFGHOUL, Soumia MERAH** **Title :** Flatness-Based Control of a PV-Battery Hybrid System with PSO and DO-Tuned PID Controllers for DC Bus
15:40 – 16:00 (Paper 75)	**Authors: Houssameddine Mansouri** **Title:** Three-Phase LCL filtered Quasi-Z Source Inverter with MIMO Sliding Mode Controller
16:00 – 16:20 (Paper 146)	**Authors: Abdelmoumene Hechifa , Abdelaziz Lakhel ,Chouaib Labiod , Said Djaballah ,Ali Bebboukha , Redha Meneceur** **Title:** Overcoming Issues with Source Data for Early Fault Detection in Power Transformers: A Comparison with Combined Triangle Methods
16:20 – 16:40 (Paper242)	**Authors: Nadjim Alti, Bayadi Abdelhafid, Ouchen Lyamine** **Title :** Analysis of Electric Field and Voltage Distribution in a 220 kV Surge Arrester Equipped with a Grading Ring Using the Finite Element Method
16:40 – 17:00 (Paper159)	**Authors: hamouda Noureddine, Badreddine Babes, Badi Ridha , Uwe Räde** Title : Enhanced the Selective and Global Harmonic Suppression in Single-Phase Systems using a Modified P-Q Based APF
17:00 – 17:20 **(Paper 160)**	**Authors: Sait Oussama, Mabrouk Khemliche, Samia Latreche, Belkacem Sait, Hamza Khemliche** Title: Real-Time Fault Detection and Classification in PV Systems Through Classical Thresholding Techniques

16:00 – 17:00	Hall Technology Poster sessions
SESSION 3 **Wednesday** **16.00 – 17:00**	**Electrical engineering** **Chairs: Dr. Mostafa Tabakh, Dr.Mohamed Sahed, Pr.Fouad Berrabeh, Dr. Defdaf Mabrouk. Dr .Cherif Bilal** **Authors and titles**

Author: Abdelouahab Benseddik, Abdelghani Boubekri, Hocin Bensaha, Djamel Daoud, Adiba Benahmed Djilali

Title(ID233)*: Experimental and Modeling Study of a Solar-Powered Greenhouse Dryer: Energy Efficiency and Thermal*

Authors: louakhche fatiha , abed ahcene, bendoumia redha , bouchekhlal ahmed

Title(ID218): *Design of C_band compact SIW power divider*

Authors: Younes Chebabhi Abdelghani Dendouga , Souhil Kouda

Title(ID74): *Simulation and Analysis of Propagation Delay and Power Dissipation in CMOS Inverter on CADENCE*

Authors*:* ***Adil Bakri, Youcef Brik, Ely cheikh Aida, Said Fahem, Salah Khennouf***

Title(139): *Development of an Arabic voice control system using convolutional neural networks CNN*

Authors: Bettahar Fares, Abdeddaim Sabrina,Betka Achour,Bettahar Seif Eddine,Michael Short,Maher Al-Greer

Title(ID156) *Parametric Identification of a Deep-Cycle Gel Battery Using the Recursive Least Squares (RLS)*

Authors: Tidjani Mahni, Mohamed Toufik Benchouia, Nadhir Mesbahi

Title(ID36): Particle Swarm Optimization of Fuzzy Logic Controller for Shunt Active Filter

Authors: Fares.Mezrag, Noureddine Chikouche, Anwar Noureddine Bahache

Title(ID125): *A Comparative Analysis of Classical and Post-Quantum Public-Key Cryptography on Resource-Constrained IoT Devices*

Authors: Abderrzak Laib,Salah Khennouf, Abdelghafour Herizi

Title(ID201): *Acoustic Emission Based Bearing Fault Localization Using Wavelet Features and Random Forest Classifier*

Authors : Hatem Mezaache, Nahed Zemouri, Zakaria Zemali

Title (ID 117): *Short-Term Solar Power Prediction with Weighted Fusion of Deep Learning and Regression Models Using Multivariate Weather Variables*

Authors: Samia Redjem , Mohamed Sahed.

Title(ID215): *Noncoherent Parameter-Free GM-CFAR Processor for Multipulse Detection in Heavy-Tailed ParetoDistributed Clutter*

Authors : Nehed Zemouri , Hatem Mezaache, Zakaria Zemali, Faboi LaForesta, Mario Versaci

Title (ID199): *Enhancing Weather Prediction Accuracy via PSO-Optimized SVR and Feature Correlation*

Thursday, December 11, 2025	
08:00 - 08:30	**Reception & Conference Registration**
08:30 - 09:15	Chair: Prof. Khodja Djalal , Pr. Said Barkat, Pr.Samir Zeghlache, Pr. Ali djerioui Keynote speech 1: Prof. Mohamed Fouad Benkhoris Speaker : Dynamic Modeling of Multi-Phase Synchronous Machines for Control Design and Analysis
09:15 - 10:00	Chair: Prof. Khodja Djalal , Pr.Said Barkat, Pr.Samir Zeghlache, Pr. Ali djerioui Keynote speech 1: TRL 5–7 & Scientific Diplomacy CNRST, Algérie Speaker: Prof. Mokhtar SELLAMI
10:00 - 10:30	**Coffee Break**
IEEE Workshop **10.30 – 12.00**	Chair: Dr. Salah khenouf , Dr. Youcef Brik , Pr. Iratni Abdelhamid , Pr. Drid Said Keynote speech 1 IEEE: Honoring the Legacy, Engineering the Future Speaker: Dr. Elotri Ahmed + Dr.Amira Ouerfelli

10:30 - 12:30	Oral Sessions

SESSION 1 **Thursday** **10:30 – 12:20**	**Electronics, Telecommunications and signal processing** — **ROOM 1** **Chairs: Prof. Hamza Bennacer , Pr. Mohamed Ladjal , Dr. ELhadi Kenane , Dr.Fares Mezrag**
	Authors and titles
10:30 – 10:50 (Paper 225)	**Authors: Meftah Sabir, Bentoumi Miloud, Dirman Hanafi Burhanuddin** **Title:** Enhancement of Transient Signal Quality in Leak Detection Applications via Savitzky-Golay and Kalman Filtering
10:50 – 11:10 (Paper 220)	**Authors: Nadir Cheyma, Brik Youcef, Attallah Bilal** **Title:** A multimodal biometric system based on multi-level fine-tuning using score fusion
11:10 – 11:30 (Paper 172)	**Authors: Maroua Louglaib,Izzeddine Chalabi** **Title:** Parameter Estimation and Modeling Performance of Compound-Gaussian Clutter with Weibull Distributed Texture
11:30 – 11:50 (Paper 106)	**Authors: Chaima Chabira, Haddi Bakhti, Miloud Bentoumi, Ibraheem Shayea, Riyadh Benyettou** **Title**: Leak Detection and Localization in Pipelines with Volume Rate Estimation Based on Pressure Signals
11:50 – 12:10 (Paper 89)	**Authors : Youssouf Bouzidi, Oussama Bouguerra, Youcef Brik, Bilal Attallah, Mohamed Djerioui** **Title :** Deep Learning Architectures for Precise Segmentation of Brain Tumors in MRI Images
12:10 – 12:30 (Paper 85)	**Authors : Ayyoub Berra, Oussama Bouguerra,Bilal Attallah, Youcef Brik, Mohamed Djerioui, Ibraheem Shayea, Saleh Ibrahim Al-Zahrani, Youssouf Bouzidi** **Title :** Enhancing Brain Tumor Classification Accuracy through Multi-Modal MRI Analysis and Advanced Ensemble Deep Learning

SESSION 1 **Thursday** **10:30 – 12:20**	**Electrical engineering and renewable energy** — **ROOM 2** **Chairs : Dr.Haddi Bakhti ,Dr.Bentoumi Meloud, Dr.Ouagueni Fayssal , Pr. Izzeddine Chalabi**
	Authors and titles
10:30 – 10:50 (Paper 65)	**Authors : Boutheyna Djemai, Amar Mezache, Houcine Oudira** **Title :** Trimodal Generalized Gamma model for Maritime Radar Sea-Clutter
10:50 – 11:10 (Paper 148)	**Authors : Abousoufyane Slatnia, Mohamed Ladjal, Mohammed Assam Ouali, Mohammed Assam Ouali, Hamza BENNACER** **Title :** Enhancing Water Quality Index Prediction: A Comprehensive Evaluation of Gaussian Noise Augmentation in Hybrid Ensemble Machine Learning Model
11:10 – 11:30 (Paper 228)	**Authors: Saad Bella, Said Barkat.** **Title:** Single-Phase Inverter Deadbeat Control with Disturbance Rejection: PIL Validation
11:30 – 11:50 (Paper 149)	**Authors : Ishaq Aiche, Youcef Brik, Bilal Attallah, Hegazy Rezk, Ibraheem Shayeai, Zool Hilmi Ismail** **Title (ID149):** High-performance diabetic retinopathy detection using MobileNetV3-Large with RGB and CLAHE fundus images
11:50 – 12:10	**Authors: Dahoum Mehdi Abdessamad, Kara Kamel, Zeghlache Samir**

(Paper 73)	**Title**: Optimized Synergetic Control based on Equilibrium Optimizer for Quadcopter Under External Disturbances and Parameter Uncertainties

SESSION 1 **Thursday** **10:30 – 12:10**	**Electrical engineering and renewable energy** **ROOM 3**
	Chairs: Pr. Loutfi Benyettou, Dr.Hilal Rahali , Hamza Mekki , Abdelghafour Herizi
	Authors and titles
10:30 – 10:50 (Paper 237)	**Authors : Hafid Benyounes, Mohammed Said Ouahabi, , Said Barkat.** Title (ID237): Observer-Based Sensor Fault-Tolerant Control for DC–DC Buck Converters
10:50 – 11:10 (Paper 238)	**Authors: Mohamed Boukhari** Title (ID238): Independent FOC Control of Dual Front Induction Motors Considering Differential Wheel Speeds in Electric Vehicles
11:10 – 11:30 (Paper 240)	**Authors**: **Zakaria Alili, Ghadbane Ismail, Bouzidi Riad, Ghilani Abdelmoumen, Ghoudbane Ahmed Marouane** Title (ID240): Sensorless BLDC Motor Control via Observer: Comparative PI Tuning with EO vs GWO and Using DSP-launchpad for PIL Validation
11:30 – 11:50 (Paper 223)	**Author: Mohammed Said Ouahabi, Said Barkat , Abdelhafid Benyounes, Syphax Ihammouchen, Mourad Zebboudj** **Title(ID234):** Sensor Fault Isolation And Tolerant Control Of Distributed Generation Power Converters In A DC Microgrid
11:50 – 12:10 (Paper 234)	**Authors: Salim Djeriou Bounif Assia, Abderrahim Zemmit, Ismail Ghadbane, Riyadh Rouabhi, Mourad Naidji** **Title :** Comprehensive Design and Analysis of Overcurrent Relay Protection and Coordination for a 220 MW Grid-Connected Power Plant

10:30 – 12:30	Hall Technology Poster sessions
SESSION 2 **Thursday** **10:30 – 12:30**	***Electrical engineering*** ***Chairs : Dr. Mohamed Ghellab, Dr. Hellali Lallouani, Dr. Bakri Badis, Dr. Abed Ahcene, Dr. Laib abderrzak.*** ***Authors and titles***

Authors** : **Keltoum Loukal Abderrahmen Bouguerra, Housseyn Serai ***Title** (ID236): Smart Control of Flexible-Joint Manipulator Arm Using a Hybrid ANFIS Architecture*
*Authors**: Arif Bourezami, Mohammed Amroune**.* *Title(ID243): Short-Term Wind Power Forecasting Using Optimally Tuned Adaptive Neuro-Fuzzy Inference System*
Authors: Abderrahmen Bouguerra, Kelthoum Loukal,Housseyn Serai ***Title(ID235):** Passive Sliding Mode Fault-Tolerant Control Approach for a Robotic arm with a Gripper*
Authors : Abdelmalik Zorig, Said Barkat, Mohammed Belkheiri, Abdelhamid Rabhi, abdelhafid Benyounes ***Title (ID241):** Control of Grid connected PV System Based Paralleled T-type Multilevel Inverters*
Authors: Abdelkader Djerad, Samir Zeghlache ***Title(ID244):** Fault Tolerant Control Based on Adaptive Type-2 Fuzzy Global Fast Dynamic Terminal Sliding Mode for Actuators Failures inan Omnidirectional Vehicle*
*Authors: **Badreddine Babes hamouda noureddine, Badi Ridha, Uwe Räde,*** *Title(ID191): Improved Efficiency of Selective Active Filtering of the Dominant Harmonic Currents Using a Robust PQ Technique-Based Single-Phase APF*
Authors : Khaled Belhouchet, Assam Zorig, Ismail Ghadbane, Abdelhakim Idir. ***Title (ID164):** Performance Evaluation of Advanced Control Strategies for Microgrids Using ANOVA-Based Statistical Analysis*
Authors : Assam Zorig, Khaled Belhouchet, Noureddine Hamouda, Badreddine Babes. ***Title (ID170):** Optimization Of Magnets And Minimisation of Torque Ripple in brushless AC embedded permanent magnet motor*
Authors: Mourad Naidji ,Salim Djeriou, Mohamed Ilyas Rahal ***Title (ID28) :** Dynamic Analysis of Transmission Power Systems with High Wind Power Integration under Severe Disturbances*
Authors : Herizi Abdelghafour, Abed Ahcene, Ouagueni Fayssal, Laib Abderrzak, Zemmit Abderrahim, Rouabhi Riyadh. ***Title (ID56):** Adaptive Fuzzy-PI Hybrid Control of Permanent Magnet Synchronous Motors*
Authors : Riyadh Rouabhi, Abdelghafour Herizi, Salim Djeriou, Labib Bensaadia. ***Title (ID68):** Lyapunov stability and control of active and reactive powers generated by wind energy conversion system based of a doubly fed induction generator*
Authors**: **Houssam eddine Ghadbane, Said Barkat, Azeddine Houari, Hegazy Rezk, Ali Chebabhi, Tedjani Mesbahi ***Title**(ID 223): Hardware-in-the-Loop of an Optimal Energy Management Strategy for Electric Vehicle Applications*

12:30 – 13:00	Conference closing