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Optimizing Power Flow with Renewable Energy Sources: A Cost-Effective Approach

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***Abstract*— Solving the optimal power flow (OPF) problem is a fundamental yet intricate challenge in power system optimization. From an optimization perspective, OPF aims to minimize specific objective functions while ensuring optimal operational settings for the power network. This involves considering key system parameters, including generator outputs. The power grid may consist of both conventional fossil-fuel-based generators and renewable energy sources (RES) such as wind and solar power. Due to the highly nonlinear nature of OPF, its complexity further escalates with the integration of intermittent RES. In this paper, a Quantum-behaved Particle Swarm Optimization with Differential Mutation (QPSODM) algorithm is introduced to address OPF under uncertainty. This approach incorporates the stochastic nature of wind and solar energy alongside conventional thermal power generation. The primary objective is to minimize total generation costs while accounting for carbon emission tax imposed on fossil fuel-based generators. The proposed method has been tested on a modified IEEE 30-bus system, and simulation results demonstrate its effectiveness in solving the OPF problem while yielding logical and optimal results.**

Keywords*— *renewable energy sources (RES); optimal power flow (OPF); generation cost; QPSODM algorithm; uncertainty

I. Introduction

Optimal Power Flow (OPF) is a fundamental challenge in power system operation, primarily aimed at optimizing the dispatch of generation resources while ensuring economic efficiency. Traditionally, OPF has focused on minimizing the operational costs of thermal power plants. However, these generators contribute significantly to environmental pollution due to high emissions. As environmental concerns grow, reducing pollutant emissions has become a key priority, necessitating a balance between economic operation and ecological sustainability.

In recent years, the integration of renewable energy sources (RESs) into power systems has increased significantly. While RESs offer a sustainable alternative to conventional generation, their integration introduces several operational challenges. The inherent variability and intermittency of RESs complicate system stability, requiring advanced modeling techniques to accurately represent their uncertain nature. The unpredictability of RESs also necessitates enhancements in protection and control mechanisms to ensure secure and reliable grid operation [1]. A comprehensive simulation model representing the electrical components of a photovoltaic (PV) power plant connected to the distribution network is discussed in [2]. The impacts of integrating RESs such as solar and wind power into electrical networks have been extensively analyzed in [3-6]. The primary objective of power system operation remains achieving optimal cost efficiency while adhering to system constraints and maintaining operational security. OPF plays a critical role in determining the optimal control settings that satisfy both economic and security requirements. Significant research efforts have explored OPF solutions incorporating RESs using various optimization techniques, including deterministic and meta-heuristic approaches. For instance, particle swarm optimization (PSO) has been applied to analyze and validate selective harmonic elimination in single-phase multilevel inverters [7]. Additionally, a gradient-based method has been proposed in [8] to develop dynamic OPF solutions that incorporate wind farms, although wind power costs were not explicitly considered. Other studies have explored the use of Newton's method and interior-point techniques to address OPF in the presence of wind power plants [9].

The uncertainty associated with wind generation has also been incorporated into cost function modeling. However, deterministic approaches often suffer from problem-specific limitations, poor convergence behavior, and susceptibility to local optima, making them inadequate for addressing complex real-world optimization challenges. To overcome these drawbacks, researchers have increasingly turned to meta-heuristic optimization methods. For example, differential evolution (DE) has been employed to solve multi-objective OPF (MO-OPF) problems involving simultaneous optimization of multiple criteria [10]. Similarly, genetic algorithms (GAs) leveraging the strength Pareto method have been used to tackle MO-OPF challenges [11], while PSO-based methods have been applied to minimize fuel costs, power losses, and emissions [12]. Traditional OPF formulations predominantly focus on thermal energy sources. However, the rising costs of fossil fuels and growing environmental concerns have driven policymakers to explore alternative energy sources such as wind, solar, and ocean-based energy [13,14]. The increasing penetration of wind and solar power necessitates modifications in OPF formulations to account for their economic and operational impacts. To achieve optimal operation in systems integrating solar and wind

energy, additional cost factors such as penalty costs and reverse power flow costs must be incorporated into the OPF framework. This extended problem formulation is referred to as Stochastic Optimal Power Flow (SCOPF) [15]. Researchers have applied SCOPF techniques to power systems that combine thermal and wind energy sources using Weibull probability density functions (PDFs) [16]. Additionally, SCOPF formulations have been extended to include hybrid systems comprising thermal, wind, and solar energy resources [17].

II. MATHEMATICAL FORMULATION

Generally, the electrical system operator (ESO) has different objectives to be minimized as power loss and cumulative voltage deviation of load buses from their required values. The interaction of these objectives makes it a challenging reaching both targets. Therefore, the form of OPF problem is defined mathematically as follows:

$$Min\ F(X,U) \tag{1}$$
$$subject\ to: \begin{cases} H(X,U)=0 \\ G(X,U)\le 0 \end{cases}$$

Where X is the set of control (independent) variables, U is the set of state (dependent) variables. $F(X,U)$ is the objective function of OPF, $H(X,U)$ is the equality constraints and $G(X,U)$ is the inequality constraints.

A. Control variables

The control variables vector is defined as follows:

$$X = [Pg_2,\dots,Vg_{ng};Vg_1,\dots,Vg_{ng};T_1,\dots,T_{nT};Qc_1,\dots,Qc_{nc}] \tag{2}$$

Where Vg_i is the voltage magnitude of the i^{th} generator bus, Qc_i is the shunt compensator banks of the i^{th} bus and T_i is the i^{th} transformer tap changer (OLTC). ng, nT and nc are the number of generating units, transformers and compensator banks, respectively.

The transformer tap settings and shunt compensator banks are considered as discrete variables.

B. State variables

The vector of state variables can be defined as follows:

$$U = [Pg_1;\ Vl_1,\dots,Vl_{N_D};Sl_1,\dots,Sl_{N_l};Qg_1,\dots,Qg_{ng}] \tag{3}$$

Where Vl_i is the voltage of i^{th} loadbus and Sl_i is the loading of i^{th} line. Qg_i is the reactive power of the generator of the bus i, N_D is the number of loadbus, N_l is the number of branches in the power system.

C. Cost model of thermal generators

Thermal generators use fossil fuel for operating. The combination between fuel cost ($/h) and produced power (MW) can be written by the quadratic relation:

$$C_{T0}(P_{TG}) = \sum_{i=1}^{N_{TG}} a_i + b_i P_{TGi} + c_i P_{TGi}^2 \tag{4}$$

where a_i, b_i, c_i are the cost coefficients of the thermal generator i generating power output P_{TGi}. Where the number of thermal generators is N_{TG}. Valve-point effect needs to be considered for more realistic and precise modelling of cost function. The thermal generating units with multi-valve steam turbines exhibit a greater variation in the fuel-cost functions. The valve loading effect of multi-valve steam turbines is modelled as sinusoidal function, the absolute value of which is added to the basic cost function in Eq. (4). Total generation cost ($/h) of thermal units becomes:

$$C_T(P_{TG}) = \sum_{i=1}^{N_{TG}} a_i + b_i P_{TGi} + c_i P_{TGi}^2 + \left|d_i.\sin(e_i.(P_{TGi}^{min} - P_{TGi}))\right| \tag{5}$$

where, d_i and e_i are the coefficients that represent the valve-point loading effect. P_{min} is the minimum power the ith thermal unit generates when in operation. All cost and emission coefficients for the thermal generating units used in the calculations are provided in Table I.

TABLE I. COST AND EMISSION COEFFICIENTS OF THERMAL GENERATORS FOR IEEE-30BUS [18]

Bus	1	2	8
Generator	TG_1	TG_2	TG_3
a	0	0	0
b	2	1.75	3.25
c	0.00375	0.0175	0.00834
d	18	16	12
e	0.037	0.038	0.045
α	4.091	2.543	5.326
β	-5.554	-6.047	-3.55
γ	6.49	5.638	3.38
ω	0.0002	0.0005	0.002
μ	6.667	3.333	2

D. Emission and carbon tax

It is well known that generating power from conventional sources of energy emits harmful gases into the environment. The emission of SOx, NOx increases with increase in generated power (in p.u. MW) from thermal power generators following the relationship in Eq. (6). Emission in tonnes per hour (t/h) is calculated by:

$$E = \sum_{i=1}^{N_{TG}} \left[\left(\alpha_i + \beta_i P_{TGi} + \gamma_i P_{TGi}^2\right) x\ 0.01 + w_i e^{(\mu_i P_{TGi})}\right] \tag{6}$$

Where, α, β, γ, ω and μ are all emission coefficients corresponding to the ith thermal generator. Emission coefficients for the thermal generating units are provided in Table 1. The coefficients are same as in [18].

In recent years, due to global warming, many countries are putting enormous pressure on entire energy industry to reduce carbon emission [19]. To encourage investment in cleaner forms of power like wind and solar, carbon tax (C_{tax}) is imposed on per unit amount of emitted greenhouse gases. The cost of emission (in $/h) is represented as:

$$C_E = C_{tax} E \tag{7}$$

The objective of OPF is formulated incorporating all the cost functions as discussed above. In first objective, emission cost is not included. To study the change in generation scheduling when carbon tax is imposed, second objective function is adopted by adding the emission cost.

Objective function 1

$$F_1 = C_T(P_{TG}) \tag{8}$$

Objective function 2

$$F_2 = F_1 + C_{tax} E \tag{9}$$

The OPF optimisation is subject to some system equality and inequality constraints.

E. Equality constraints

The power balance equations can be expressed as follows:

$$P_{g_i} - P_{d_i} = V_i \sum_{j=1}^{N_b} V_j \left[G_{ij} \cos(\theta_i - \theta_j) + B_{ij} \sin(\theta_i - \theta_j)\right] \quad (10)$$

$$Q_{g_i} + Q_{C_i} - Q_{d_i} = V_i \sum_{j=1}^{N_b} V_j \left[G_{ij} \sin(\theta_i - \theta_j) - B_{ij} \cos(\theta_i - \theta_j)\right] \quad (11)$$

Where N_b is the number of buses. Pd, Qd are active and reactive load demand, respectively. Pg, Qg are active and reactive power of generators connected to bus i, respectively. G_{ij} is the conductance and B_{ij} is the susceptance connecting the buses i and j, respectively.

F. Inequality constraints

The operational limits of the equipment must be kept in a predetermined range and can be expressed as follows:

Generator constraints:

$$\begin{cases} Pg_i^{max} \geq Pg_i \geq Pg_i^{min} \ \forall i \in ng \\ Qg_i^{max} \geq Qg_i \geq Qg_i^{min} \ \forall i \in ng \end{cases} \quad (12)$$

Transformer constraints:

$$T_i^{max} \geq T_i \geq T_i^{min} \ \forall i \in nT \quad (13)$$

Shunt compensator constraints:

$$Qc_i^{max} \geq Qc_i \geq Qc_i^{min} \ \forall i \in nc \quad (14)$$

Security constraints:

$$\begin{cases} V_i^{max} \geq V_i \geq V_i^{min} \ \forall i \in N_b \\ Sl_i^{max} \geq |Sl_i| \ \forall i \in N_l \end{cases} \quad (15)$$

III. Renewable Energy Source Uncertainty Models

The output wind power for different wind speed can be defined in the equation as follows [20, 21]:

$$P_w(v) = \begin{cases} 0 & v < v_{in} \text{ and } v > v_{out} \\ P_{wr}\left(\dfrac{v - v_{in}}{v_r - v_{in}}\right) & v_{wr} \geq v \geq v_{in} \\ P_{wr} & v_{out} \geq v \geq v_{wr} \end{cases} \quad (16)$$

Where $P_w(v)$ is wind output power in (MW), v is the wind speed in (m/s), P_{wr} is the rated output wind power, and v_{in}, v_{out}, v_r are the cut-in, cut-out and rated wind speed, respectively.

The solar irradiance to energy conversion function of the PV system can be expressed as follows:

$$P_s(G) = \begin{cases} 0 & G = 0 \\ P_{sr}\left(\dfrac{G^2}{R_c G_{std}}\right) & R_c > G > 0 \\ P_{sr}\left(\dfrac{G}{G_{std}}\right) & G \geq R_c \end{cases} \quad (17)$$

Where G is the solar irradiance in (W/m^2), G_{std} is the solar irradiance in standard environment set as 1000 W/m^2. R_c presents a certain irradiance point set as 150 W/m^2. P_{sr} is the rated output power of the PV system. Here, it is assumed that the temperature of PV cell is neglected and the PV output power is mainly subordinated on the irradiance.

A. Modified IEEE 30 bus system

The IEEE 30-bus system involves 6 generators, 41 lines, 4 transformers that are located at lines 6-9, 4-12, 9-12 and 27-28. 9 reactive compensators are installed at buses 10, 12, 15, 17, 20, 21, 23, 24 and 29. The single line diagram of the system under study is shown in Fig. 1. In our case study of IEEE-30 bus system, conventional generators in bus 5 and bus 13 are replaced by wind farm and solar plant, respectively.

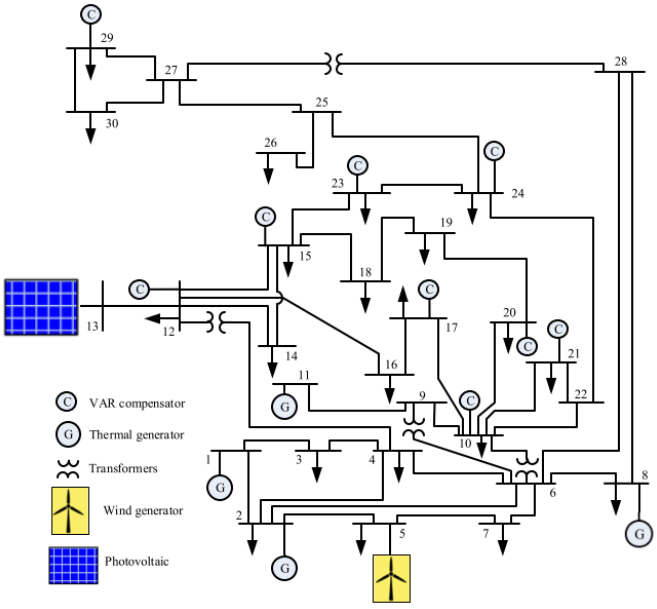

Fig. 1. Single line diagram of the modified IEEE 30 bus system.

Minimum and maximum limit settings for, bus voltage, generators voltages, tap transformers are provided in Table II.

TABLE II. Description of System Under Study

Description	IEEE 30-bus
Buses	30
Generators	6
Transformers	4
Shunt capacitors	9
Load buses	19
P_{load} (MW)	283.4
Q_{load} (MVAr)	126.2
Initial P_{loss} (MW)	5.812
Generators voltage (pu)	[0.95 - 1.10]
Load bus voltage (pu)	[0.94 - 1.06]
OLTC setting (pu)	[0.90 - 1.10]

Upper and lower limits of real and reactive power generations are given in Table III.

TABLE III. GENERATORS DATA OF THE MODIFIED IEEE 30 BUS TEST

Bus	Pg (MW)	Pgmin (MW)	Pgmax (MW)	Qgmin (MVar)	Qgmax (MVar)
1	Slack	50	200	-20	150
2	80	20	80	-20	60
5	50	15	50	-15	62.5
8	20	10	35	-15	48.7
11	20	10	30	-10	40
13	20	12	40	-15	44.7

Weibull fitting and wind frequency distributions in Fig. 2

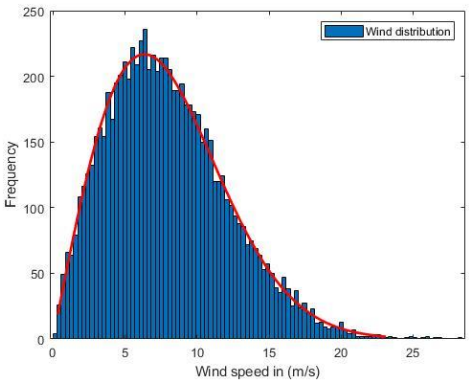

Fig. 2. Wind speed distribution (c = 9.9, k = 2.5).

Fig. 3 indicates frequency distribution and lognormal fitting of solar irradiance

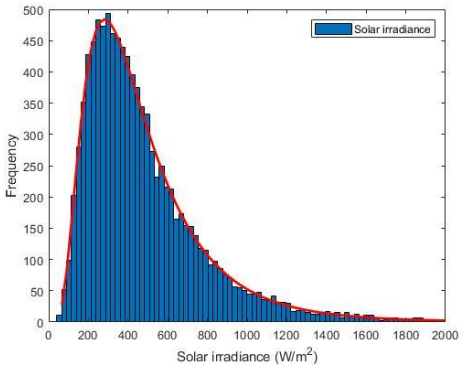

Fig. 3. Solar irradiance distribution (a = 17.5, b = 1.3).

IV. QPSODM ALGORITHM FORMULATION

In this section, PSO and quantum-behaved PSO (QPSO search algorithm is described first, followed by QPSODM algorithm, the constraints handling is also defined. The complete and detailed description of the algorithm can be found in [20, 21]. A QPSO which include differential mutation (QPSODM) algorithm for OPF problem is proposed. The main purpose of including differential mutation part in the QPSO algorithm is for improving the global search capability.

The differential mutation (DM) process is performed on each agent of the following vector,

$$x_{i,j}^{t} = x_{i,j}^{t} + f_m(x_{a,c}^{t} - x_{b,d}^{t})\ ;\ i = 1,2,\dots,m\ \&\ j = 1,2,\dots,n. \quad (18)$$

Where f_m is called (mutation factor), this factor is utilized for adjusting the perturbation size in the mutation operation as well as improving the convergence of the algorithm. a and b are random integers uniformly chosen from the range $[1,2,\dots,m]$. c and d are randomly chosen with uniform distribution between the range $[1,2,\dots,n]$. In Eq. (18), the term $f_m(x_{a,c}^{t} - x_{b,d}^{t})$ is called differential part. The description of the proposed algorithm is abstracted here below.

Step 1: *Create particles with random positions and set the P_{best} position of each particle as $P_{best,i}^{0} = x_{best,i}^{0}$.*
Step 2: *Set the generation counter as $t = 1$.*
Step 3: *Compute the mean best position M for all particles.*
Step 4: *For each particle, compute the objective function $f(x_i^t)$, constraint function and constraint handling by using the Eqs. If $(x_i^t) < f(x_i^{t-1})$, then $P_{best,i}^{t} = x_i^t$ and $f(P_{best,i}^{t}) = f(x_i^t)$.*
Step 5: *Select the current G_{best} position G_{best}^{t}.*
Step 6*: For each particle, select the stochastic value $\Omega_{i,j}^{t}$.*
Step 7: *Update each agent of the current position $x_{i,j}^{t+1}$.*
Step 8: *For each agent of new position $x_{i,j}^{t+1}$, perform the DM operation with the mutation probability P_m, and then return to Step 2.*

V. SIMULATION RESULTS

Multiple case studies are conducted on the modified IEEE-30 bus system to evaluate the effectiveness of the QPSODM algorithm. The results of these studies are analyzed in this section, demonstrating the algorithm's performance in solving the OPF problem. Each optimization scenario undergoes a maximum of 400 iterations per run to ensure convergence. To enhance the reliability of the results, multiple simulations are executed, and the optimal objective function value, corresponding to the best configuration of control variables, is recorded.

A. Case 1: Minimization of the generation cost

This case performs optimization of generation planning for all thermal and renewable source generators to minimize total generation cost given by Eq. (8). PDF parameters are taken from [20, 21] and provided in Fig. 2 and Fig. 3. The convergence of QPSOMD algorithm is indicated in Fig. 4. As can be seen from the curve, the optimum cost is achieved within about 100 iterations. Optimum settings of all control variables, generator reactive power (Q), total generation cost and other useful calculated parameters are summarized in Table 4.

Voltage V_i in the table signifies the voltage at bus i, Ploss and CVD are calculated using Eqs. as in [20, 21].

According to the generation schedules tabulated in the Table 4, minimum generation cost that can be achieved is 787.29 $/h.

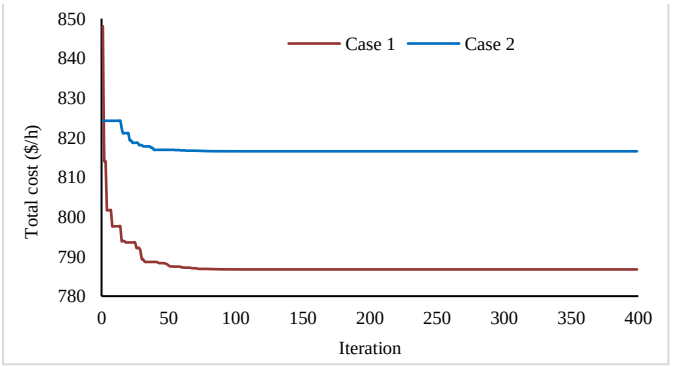

Fig. 4. Optimization convergence for Case 1 and Case 2.

B. Case 2: Minimization of generation cost with carbon tax

This case study minimizes total generation cost that includes carbon tax imposed on the emission from conventional thermal power generators. The total cost, given by Eq. (9), is to be minimized. Carbon tax rate (C_{tax}) is assumed to be 20 $/tonne as in [19]. As wind and solar power are clean form of energy, the integration of these sources should be increased due to the carbon tax rate. Optimum generation schedule, generator reactive power, total generation cost with carbon tax and other calculated parameters are tabulated in Table IV.

TABLE IV. SIMULATION RESULTS FOR THE DIFFERENT CASES – MODIFIED IEEE 30-BUS SYSTEM

Variables	Min value	Max value	Case 1 Min. Cost	Case 2 Min.Cost+Tax
Pg1 (MW)	50	200	134.91	124.37
Pg2 (MW)	20	80	30.997	35.517
Pw5 (MW)	0	50	45.09	47.277
Pg8 (MW)	10	35	10	10
Pg11 (MW)	10	60	38.03	39.764
Ps13 (MW)	0	40	30.125	31.757
V1 (p.u)	0.95	1.1	1.0722	1.0713
V2 (p.u)	0.95	1.1	1.0574	1.0579
Vw5 (p.u)	0.95	1.1	1.0356	1.0368
V8 (p.u)	0.95	1.1	1.0999	1.0406
V11 (p.u)	0.95	1.1	1.0984	1.0982
Vs13 (p.u)	0.95	1.1	1.0479	1.0541
Qg1 (MVAr)	-20	150	-2.1968	-2.5787
Qg2 (MVAr)	-20	60	12.023	12.712
Qg5 (MVAr)	-15	62.5	22.417	22.851
Qg8 (MVAr)	-15	48.7	40	35.614
Qg11 (MVAr)	-10	40	30	30
Qg13 (MVAr)	-15	44.7	14.786	17.122
Tot Cost ($/h)	-	-	787.29	798.1
Emission (t/h)	-	-	1.7616	0.9356
Ploss (MW)	-	-	5.7504	5.2856
CVD (p.u)	-	-	0.45261	0.46568

It is observed that the integration of solar and wind energy is significantly higher in Case 2, where a carbon tax is applied, compared to Case 1, which assumes no emission penalties. As anticipated, the extent of this increase in the optimal renewable energy generation schedule is influenced by both the total volume of emissions and the imposed carbon tax rate. Higher emission levels and stricter tax policies incentivize a greater shift toward renewable energy utilization, reinforcing the effectiveness of carbon taxation as a mechanism for promoting cleaner energy integration.

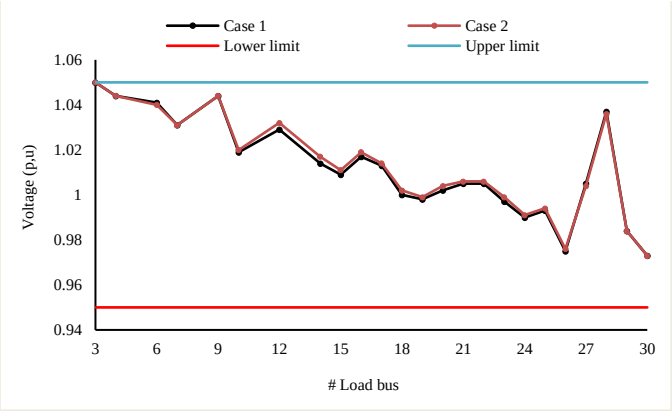

Fig. 5. Voltage profiles of load buses for Case 1 and Case 2.

In the OPF problem, maintaining load bus voltage within permissible limits is crucial, as these voltages often operate near their constraints. In this study, the load bus voltage is regulated within the range of [0.95, 1.05] p.u. to ensure stable operation. Fig. 5 illustrates the voltage profiles of load buses for both Case 1 and Case 2, showing that the two curves exhibit a high degree of similarity.

VI. CONCLUSION

This paper presents an approach to solving the optimal power flow (OPF) problem while incorporating the stochastic nature of solar photovoltaic and wind power generation. The uncertainties associated with these renewable energy sources are characterized using various probability density functions to ensure a realistic representation of their intermittency. Additionally, the total generation cost is analyzed, considering the impact of carbon emission taxes imposed on conventional fossil-fuel-based generators. The QPSODM algorithm, recognized for its strong convergence properties, demonstrates its capability to efficiently reach the global optimum, making it a viable method for addressing multimodal and highly nonlinear optimization challenges. Its effectiveness in improving global optimization solutions for OPF problems highlights its potential for broader applications in power system optimization.

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[21] M. Naidji, M. Boudour, "Evaluation de la Stabilité et Proposition d'un Plan de Défense des Réseaux de Distribution en Présence des Sources d'Energie Renouvelable", Thèse de Doctorat, USTHB, Alger, 2021.

People's Democratic Republic of Algeria

Ministry of Higher Education and Scientific Research

Mohammed BOUDIAF University of M'Sila

Faculty of Technology

The Electrical Engineering Laboratory organizes:

The First National Conference on Renewable Energies and Advanced Electrical Engineering (NC-REAEE'25)

May 06-07th, 2025

Conference Objectives

This conference aims to explore the latest developments in the fields of renewable energy and electrical engineering by bringing together researchers, engineers, experts and PhD students to exchange ideas, present their latest research findings and discuss emerging challenges and innovations in the field of renewable energy and advanced electrical systems.

Themes

1. **Renewable Energy and Green Hydrogen**
2. **Advanced control of Electric Machines**
3. **Power electronics and Smart Grid**
4. **Automatic and robotics**
5. **Electric vehicles technologies**
6. **Intelligent control and Optimization**

Important dates

- **Paper submission Deadline: April 10, 2025**
- **Notification of Acceptance: April 25, 2025**
- **Camera-ready: May 01, 2025**
- **Symposium dates: May 06-07,2025**

Honorary chairs

Pr. Amar BOUDELLA , Rector of University

Dr. Abdelkader DJERAD, Dean of Faculty

Conference chair

Dr. Abderrahim ZEMMIT

Scientific committee chairs

Pr. Ismail GHADBANE

Scientific committee

Pr. Sabir MESSALTI (University of M'sila)
Pr. Said BARKAT (University of M'sila)
Pr. Abdelghani HARRAG (University of Setif1)
Pr. Aissa CHOUDER (University of M'sila)
Pr. Djalal eddine KHODJA (University of M'sila)
Pr. Hani BENGASMIA (University of M'sila)
Pr. Mabrouk DEFDAF (University of M'sila)
Pr. Youcef BEKAKERA (University of Oued souf)
Pr. Yacine BENSAFIA (University of Bouira)
Dr. Yacine DAILI (University of Setif1)
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Dr. Abdelmalik ZORIG (University of M'sila)
Pr. Ali DJRIOUI (University of M'sila)
Pr. Khatir KHETTAB (University of M'sila)
Dr. Amar GUICHI (University of M'sila)
Dr. Abdelouahab BOUKHALFA (University of M'sila)
Pr. Ali CHEBABHI (University of M'sila)
Dr. Abdelhafid BENYOUNES (University of M'sila)
Dr. Riadh BOUZIDI (University of M'sila)
Dr. Khaled BELHOUCHET (University of M'sila)
Dr. Naas DJEDAOUI (University of Djelfa)
Dr. Abdelouadoud LOUKRIZ (University of STHB)
Dr. Fares KHALFALLAH (University of M'sila)
Pr. Abderrahman BOUGERRA (University of M'sila)
Dr. Hilal RAHALI (University of M'sila)
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Pr. Loutfi BENYETTO (University of M'sila)
Dr. Redah CHEIKH (CDER- Bousmail)
Dr. Abdelouahab BENSEDIK (URAR Ghardaia)

Organizing chair

Dr. Riyadh ROUABHI

Organizing committee

Dr. Salim DJERIOU (University of M'sila)
Dr. Abdelghafour HERIZI (University of M'sila)
Dr. Faysal OUAGNI (University of M'sila)
Dr. Assam ZORIG (University of M'sila)
Dr. Abdelhakim DJAALAB (University of M'sila)

Participation fees

*** Students: 2000 DA**

*** Academics: 4000 DA**

*** Industrials: 8000 DA**

Secretariat

E-mail : NC-REAEE25@univ-msila.dz

Conference Web Site

https://media.univ-msila.dz/NC-REAEE25

Registration

Registration will be done on the Microsoft CMT :

https://cmt3.research.microsoft.com/NCREAEE2025

The First National Conference on Renewable Energies and Advanced Electrical Engineering (NC REAEE'25)

May 06-07th, 2025

University of M'Sila

Faculty of Technology

Electrical Engineering Laboratory (LGE)

NC-REAEE'25

Conference Program

Tuesday, May 6th 2025

IBN AL-HAYTHAM Lecture Hall : https://maps.app.goo.gl/EDNkftHauFxdEvfK8

[08:00] - [08:30]	**Welcome & Registration**
[08:30] - [09:00]	**Opening Ceremony** ***Dr. Abderrahim ZEMMIT,*** *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.*
Plenary Session 1, **Chairs:** Pr. MESSALTI. S, Pr. HARRAG. A, Pr. HADJ ARAB. A , Pr. CHOUDER.A	
[09:00] - [09:30]	**Plenary Talk 1: Demand side management effects on PV systems sizing** Pr. Smail SEMAOUI (CDER- Algiers, Algeria)
[09:30] - [10:00]	**Plenary Talk 2: Toward the application of advanced control and Embedded artificial intelligence to industrial systems: real cases studies** Pr. Bilal SARI (University of Setif1)
[10:00] - [10:15]	**Plenary Talk 3: The Past, the Present and the Future Vision of IEEE Algeria Section** Pr. Bilal ATTALLAH (Vice President of IEEE Algerian section)
[10:30] - [11:00]	**Coffee Break**
[11:00] - [12:30]	**Oral Session 1 (ROOM 01, 02, 03)** / *Faculty of Technology*
	Poster Session 1 / *Faculty of Technology*
[12:30] - [14:00]	**Lunch**
[14:00] - [15:30]	**Oral Session 2 (ROOM 01, 02, 03)**
	Poster Session 2
[16:00] - [18:00]	**Online Session 1**
[18:00] - [20:00]	**Online Session 2**

The First National Conference on Renewable Energies and Advanced Electrical Engineering (NC REAEE'25)

May 06-07th, 2025

University of M'Sila

Faculty of Technology

Electrical Engineering Laboratory (LGE)

Wednesday, May 7th, 2025

Faculty of Technology: *https://maps.app.goo.gl/B8AnPfAnaZwLbzbM6*

[08:00] - [08:30]	**Welcome & Registration, 2nd Day**
Plenary Session 3, **Chairs**: Pr. BARKAT.S, Pr. Ali DJERIOUI, Pr. CHEBABHI A, Dr. GUICHI.A (***Hall L29- ST***)	
[08:30] - [09:00]	**Plenary Talk 4: Photonic Crystal Structures for Photovoltaic Applications** Pr. Mounir BOURAS (University of M'Sila)
[09:00] - [09:30]	**Plenary Talk 5: A "How-to" on giving a Successful Conference Presentation** Pr. Slimane BENMAHMOUD (University of M'Sila)
[09:30] - [09:45]	**Plenary Talk 6: Sustainable Energy Transition in Algeria's Construction Industry: "Challenges, Opportunities, Policy Pathways, and Barriers"** Dr. Khadidja RAHMANI (University of Blida1)
[09:45] - [10:00]	**Coffee Break** *(Faculty of Technology)*
[10:00] - [11:30]	**Oral Session 3 (ROOM 01, 02, 03)**
	Poster Session 3
[11:30] - [12:00]	**Closing Ceremony (*L29 - Faculty of Technology)***
[12:00] - [13:00]	**Lunch**

*** To view the full program, please scan the corresponding QR code.**

Details of communications by session

Tuesday, May 6th 2025

Faculty of Technology : https://maps.app.goo.gl/B8AnPfAnaZwLbzbM6

• Oral Session 1

ROOM 01				
Chairs : Pr. Abderrahmen BOUGUERRA & Dr. Hilal RAHALI				
Time	**Paper ID**	**Author**	**Title**	**Establishment**
11 :00-11 :15	**111**	Ahmed MESAI BELGACEM	Fault diagnosis of Photovoltaic Arrays Based on Extreme Gradient Boosting Learning	University of Jijel
11 :15-11 :30	**226**	Touil Abderrahim	Fault Detection and Control for Managing Multi-Fault Conditions in Power Inverters for Renewable Energy Systems	University of Constantine 1
11 :30-11 :45	**08**	Mourad Naidji	Optimizing Power Flow with Renewable Energy Sources: A Cost-Effective Approach	University of Annaba
11 :45-12 :00	**268**	Benzaoui Khaled	Implementation of a Combined Wind Turbine and DSIG System Using Real-Time HIL Simulation	University of M'sila
12 :00-12 :15	**170**	Hamouda Noureddine	Single Phase Active Power Filter for Selective and Global Harmonic Currents Mitigation using Modified PQ Theory	Research Center in Industrial Technologies-Cheraga

ROOM 02				
Chairs : Dr. Khaled BELHOUCHET & Dr. Lakhdar MADANI				
Time	**Paper ID**	**Author**	**Title**	**Establishment**
11 :00-11 :15	**125**	Taha Chettibi	A Hybrid Optimization Method for the Inverse Kinematics of Robotic Manipulators	University of Blida 1
11 :15-11 :30	**158**	Aicha Aziza Ayad	Experimental optimization of MAPbI3 perovskite solar structure: control of deposition speed (comparative study of optical and structural proprieties)	University of Djelfa
11 :30-11 :45	**261**	ARABA Mabrouk	Smart street lighting: remote control and energy saving	University of M'sila
11 :45-12 :00	**54**	Mohamed Lemine Bakayoko Yaye	Improved Control of PV System using Variable Step Size IC MPPT Method	University of Msila
12 :00-12 :15	**57**	Zaina Ait-Chekdhidh	PID-Funnel Control for the Speed of Wind Energy Systems for Maximum Power Point Tracking	University of Tizi Ouzou

ROOM 03				
Chairs : Pr. Khatir KHETTAB & Dr. Abdelouaheb BOUKHALFA & Dr. Khadidja RAHMANI				
Time	**Paper ID**	**Author**	**Title**	**Establishment**
11 :00-11 :15	**78**	Ouali Abdelhak	Fuzzy Logic-Based Direct Power Control of Three-Level Grid-Connected Inverters with Capacitor Voltage Balancing	University of Ouargla
11 :15-11 :30	**202**	Djaraf Nourelhouda	Hierarchical Control of Islanded Microgrids with GA-Optimized Virtual Inertia and Damping	University of Setif 1
11 :30-11 :45	**62**	Bounnah Abdelmalek	Parametric Analysis and Performance Optimization of an Adsorption Refrigeration System Using Activated Carbon-Methanol Pair	University of Constantine 1
11 :45-12 :00	**110**	Kheira KAHILI	Online Fault Detection and Diagnosis of Multiple Short Circuits Phases PMSG in Wind System Based on Decision Tree with Bayesian Optimization	University of Jijel
12 :00-12 :15	**102**	Berini Mohamed Rafik	Viscoelastic behavior and its effect on pumping energy under the influence of petroleum extract	University of M'sila

• Poster Session 1

Poster Session 1 / *Faculty of Technology*			
Chairs : Pr. Fouad BERRABAH & Pr. Loutfi BENYETTOU & Dr.Mabrouk DEFDAF & Pr. BELKHIRI Salah			
Paper ID	**Author**	**Title**	**Establishment**
138	Meftah allal	Development of Advanced Recycled Concrete: Electrically Insulative and Resistant to Ground Current Propagation	University of Biskra
29	Boudab Smail	Multi-objective Combined Economic Emission Dispatch solution using a Recurrent Neural Network	University Oum El Bouaghi
137	TOUIL Issam	Design and Control of an Industrial Exoskeleton Using Arduino-Based System and Hydraulic Actuation	Center of Research in Mechanic-Constantine
259	El Hadi Belhiteche	Influence of electrical stress on the dielectric properties of the epoxy resin used in the electrical machines insulation	University of M'sila
235	Karim Fathi Sayeh	AI-Based Direct Power Control for WT-DFIG Systems	University of Bejaia
60	BERKANE Amina	Exploring the Interplay Between Green Hydrogen Production and Microscopic Magnetization	University of M'sila
248	Imene Moumeni	A new design of a two-channel demultiplexer based on a photonic crystal ring resonator	University of Constantine 1
139	Mokrane Hamza	Distributed Watermarking for Detect Replay Attacks for 4 DGUs in DC Microgrids with Variants Loads	University of Medea
103	Hadji Chaabane	A Hybrid Robust Backstepping Sliding Mode Controller design for double star induction Machine DSIM	University of M'sila
207	Imane CHERGUI	Ultra Small Optical Photonic Crystal XOR Logic Gate	University of Constantine 1
51	Ladjal badreddine	Using FTC based on BSC and nonlinear adaptive observer for dual star induction machine modeling and control	University of M'sila
233	LARBA MOHAMMED	Fuzzy Sliding Mode Control of a Double-Star Asynchronous Machine Powered by Two Three-Level Voltage Inverters	University Béjaia
205	Hadji Chaabane	Extended Kalman Filter for Speed Sensorless Control of double star Induction Motors DSIM with Estimations of Rotor flux and Load Torque	University of M'sila
47	DJOURNI Youcef	Mitigating Constant Power Load-Induced Instability Using Fractional Order Buck Converter and Backstepping Control	University of M'sila
90	Bekhiti Abdellah	Enhanced UAV Fault Diagnosis and Compensation via Nonlinear Disturbance Observer and Adaptive Control	University of Ourgla
260	Lallouani HELLALI	Application of the Fourier Transform for the Fault broken Rotor Bars Detection in Induction Motors	University of M'sila

• Oral Session 2

ROOM 01				
Chairs : Dr. Amar GUICHI & Dr. Bilal Djamal Eddine CHERIF				
Time	**Paper ID**	**Author**	**Title**	**Establishment**
14 :00-14 :15	**45**	Mohammed Messaoud Zioud	Direct Power Control of Two-Level Grid-Connected Converters Using Fuzzy Logic Controller	University of Ouargla
14 :15-14:30	**76**	Belkacem Merzouk	The contribution of photovoltaic energy in textile wastewater treatment using electrochemical processes	University of M'Sila
14 :30-14 :45	**167**	Zorig assam	Detection of Rotor excentricite Fault In Induction Machine Based On Stray Magnetic Flux.	University of M'Sila
14 :45-15 :00	**128**	BOUDAB Smail	Environmental/Economic Dispatch Problem Solution Based on Quasi-Lagrangian Dynamic Neural Network	University Oum El Bouaghi
15 :00-15 :15	**250**	Oussama Djaidja	Fault Tolerant Control based on ILC control Application to DFIG	University of M'sila

ROOM 02				
Chairs : Dr. Khaled BELHOUCHET & Dr. Lakhdar MADANI & Pr. Sabir MESSALTI				
Time	**Paper ID**	**Author**	**Title**	**Establishment**
14 :00-14 :15	**206**	Bentafer Raouf	A enhanced pll architecture for stability improvement of grid-connected converters under weak grid and fault-ride through conditions	University ferhat abbas setif 1
14 :15-14:30	**03**	Bennia Rachid	Performance Improvement of Partially Shaded PV Systems through Optimization Algorithms: Comparative Analysis of Classical and recent Techniques	Ecole Nationale Polytechnique, Alger
14 :30-14 :45	**122**	Tarek Bouguerra	Performance Enhancement of Standalone Photovoltaic System Using Variable Step Size MPPT Techniques	University of Constantine 1
14 :45-15 :00	**184**	Saber BOUAFIA	Improving Power Quality in Four-Wire Distribution System Using a four Legs Distributed STATCOM	University of M'sila
15 :00-15 :15	**109**	Tarek BOUDJERDA	Proposed energy management for a PV/WT-DFIG microgrid with energy storage system	University of Bejaia

ROOM 03				
Chairs : Dr. KHALFALLAH fares & Dr. KEBAILI Farida & Dr. Adel BALLOUTI				
Time	**Paper ID**	**Author**	**Title**	**Establishment**
14 :00-14 :15	**11**	Benkaihoul Said	Fault Detection in Photovoltaic Systems using WGformer: A Weibull-Gaussian Informer	University of Djelfa Djelfa

14 :15-14:30	**48**	Ladjal badreddine	Sturdy Adaptive Fuzzy Backstepping Control for Enhanced Tracking Performance in a 2-Dof Laboratory Helicopter System	University of M'sila
14 :30-14 :45	**04**	Samia Satta	Electrical Equivalence between Plan-Plane and Multi Points-Points Systems InThe Development of Parallel Discharges on Insulating	Research center of industrial technologics CRTI
14 :45-15 :00	**88**	Naima Amina	Design and Optimization of a 2D radial flux Permanent Magnet Eddy Current Coupler PMECC	University of USTHB
15 :00-15 :15	**258**	Aboubaker Essaddiq MAZOUZ	Comparative Study between Venturini and SVM Control in Matrix Converters with DFIG Based Wind Turbines	University of Tiaret

• Poster Session 2

Poster Session 2 / *Faculty of Technology*			
Chairs : Dr. Moufdi HADJAB & Pr. Mohamed LAADJAL & Dr. Assam OUALI & Pr. Bilal ATTALLAH			
Paper ID	**Author**	**Title**	**Establishment**
252	Karim Fathi Sayeh	Intelligent energy management of micro-grid system associated with hybrid energy storage system	University of Bejaia
201	Nacer Merabet	Inter-Turn Fault Diagnosis and Fault-Tolerant Control for Induction Motors	University of constantine1
61	BERKANE Amina	Analytical Characterization of Density, Magnetization, and Current in 2D Electron Gases	University of M'sila
147	Bouchareb Khaled	Performance Comparison of the Andasol-1 Solar Power Plant Under Algerian and Spanish Climatic Conditions	University of M'sila
79	Bakayoko Yaye Yébé	Comparative Study Between Five MPPT Techniques applied to PV System	University of M'sila
247	Khennouf salah	Boosted Photoconversion Efficiency of Silicon Solar Cells via Spectral Management Using Wavelength-Selective Optical Filters	University of M'sila
46	DJOURNI Youcef	Fractional Order Modeling for Improved Stability of DC Microgrids under Dynamic Conditions	University of M'sila
176	Ouali Abdelmoumin	Detection of Stator Winding Faults in Permanent Magnet Synchronous Motor Based on Signal Processing	University of Biskra
213	Benabbas Sabrina	Modeling and Evaluation of the Solar Resource in the M'Sila Region Using MATLAB Tools	University of Bordj Bou Arreridj
267	Charik Khalissa	Design and Simulation of a High-Speed Photonic Crystal Half Adder Applying Nonlinear Kerr Effects	University of Constantine 1
208	Chergui Imane	A Novel Optical Diplexer Design Using Core–Shell Rod Defects in Photonic Crystals	University of Constantine 1
42	MILOUDI Khaled	Deep Learning for Wind Energy Prediction from Meteorological Data and Its Application to Renewable Energy Systems	University of El Oued
118	Chettouh Salah	Modeling of Short Channel Effects in Scaled FinFET Structure	University of Boumerdes
238	Lahlou Abad	A Comparative Analysis of SP and TCT Configurations with Resistance Variation Impacts in PV Systems	University of Bejaia
131	Khaled Belhouchet	Electric Field Stress Mitigation in Polymeric Insulators Using ZnO-Based Nonlinear Coatings: Simulation and Analysis	University of M'sila
178	Leila BECHANE	Improving the performance of a SnO2/CuO/GaAs solar cell using numerical simulation	University of M'sila
119	Ayoub Dehikel	Advanced FPGA Implementation of the Simplified Space Vector Modulation for Multilevel Converters	University of Ouargla

Wednesday, May 7th, 2025

- **Oral Session 3**

ROOM 01				
Chairs : Dr. Youcef Brik & Dr. Mohamed SAHED				
Time	**Paper ID**	**Author**	**Title**	**Establishment**
11 :00-11 :15	**152**	CHABIRA Chaima	Leaks Detection in WDNs Using Pressure Signals Based on CWT and CNN	University of M'sila
11 :15-11 :30	**269**	Meryem KETFI	Deep Learning with Skip and Residual Connection for Lung Cancer CT Scan Classification	University of M'sila
11 :30-11 :45	**239**	NADIR Cheyma	One VS Multi-instance biometrics system using Palmprint	University of M'sila
11 :45-12 :00	**164**	Douiou Zoulikha	On the parameter estimation of CGLNT radar clutter	University of M'sila
12 :00-12 :15	**84**	Moustari Mohamed Abderaouf	Deep and handcrafted feature fusion system for Diabetic Retinopathy detection and classification	University of M'sila

ROOM 02				
Chairs : Pr. Djamel ALLALI & Dr. Zohra ZERDOUMI & Dr. ELBAR Mourad				
Time	**Paper ID**	**Author**	**Title**	**Establishment**
11 :00-11 :15	**96**	MEFTAH Sabir	Wavelet Transforms and AI Integration for Enhanced signal Quality to an Efficient Leak Detection	University of M'sila
11 :15-11 :30	**246**	Ishaq Aiche	Detection of Diabetic Retinopathy in Fundus Images Using the Hybrid Inception-ResNet-v2 Model	University of M'sila
11 :30-11 :45	**270**	Imad Eddine Djerarda	A Deep Learning-Based Real-Time Driver Safety System for Drowsiness	University of M'sila
11 :45-12 :00	**38**	Fares bettahar	Experimental Optimization of Photovoltaic System Performance	University of Biskra
12 :00-12 :15	**105**	Aoufi Saliha	Control of a Photovoltaic Pumping System Using the Artificial Bee	University of M'sila

ROOM 03				
Chairs : Pr. Ismail GHADBANE & Dr. ABED Ahcene & Dr. ZORIG Assam				
Time	**Paper ID**	**Author**	**Title**	**Establishment**
11 :00-11 :15	**212**	Hadjab meryem	Fuzzy logic applied to the direct torque control (DTC) of a doubly star induction machine (DSIM)	Universite of M'sila
11 :15-11 :30	**219**	Mezrag Fadila	Band Gap Energies of lattice matched GaxIn1-xAsyP1-y quaternary alloys to InP and GaAs substrates	University of M'sila
11 :30-11 :45	**194**	Kouici haroun	Optimization and Simulation of Photonic Crystal Coupled Cavity-Waveguide Structures for Sensing	University of Blida1

11 :45-12 :00	**216**	Khalissa Saada	Sustainable Performance of Sisal and Luffa Fibers in Green Hydrogen Systems	University of M'sila
12 :00-12 :15	**69**	Zegaar Imane	Band-stop plasmonic filter in the mid-infrared range based on metal-insulator-metal (MIM) waveguide.	University of M'Hamed Bougara

• Poster Session 3

Poster Session 3 / *Faculty of Technology*			
Chairs : Pr. Izzeddine CHALABI & Dr. Salah KHENNOUF & Dr. Haddi BAKHTI & Pr. Torkia GHELLAB			
ID	**Author**	**Title**	**Establishment**
23	Rahali Hilal	Analyzing and modeling an insulating surface's leakage current in high voltage	University of M'sila
150	Sabah Touahria	Experimental study of the absorption of capillary water in a compressed and stabilized mud brick	University of M'sila
244	Mezaache Hatem	Hybrid Model for short-term Solar Energy Forecasting Based on Decomposition Techniques with Sample Entropy and Bidirectional Deep Neural Networks	University of M'sila
129	Khaled Mahdi	Production of electric current using a solar concentrator	University of M'sila
148	LOUAKHCHE FATIHA	Compact SIW Band-pass Filters in [2-12 GHz] for Telecommunication Systems	University of Blida 1
189	Nafissa Moussaoui	Assessment of the efficacy of double junction solar cells (GaAs/a-Si) in relation to temperature effects numerically	University of M'sila
182	Bakhti fatima zohra	Thermal Performance Analysis of a Flat-Plate Solar Collector	University of M'sila
172	Gouri Amel	Modeling and Simulation of a Single-Phase Inverter Based on Unipolar SPWM Technique	University of M'sila
15	Dilmi Ali	Evaluating the impact of varied capacitance values on the performance of Self-Excited Induction Generator Using Finite Element Method	University of Bouira
188	Choug Noreddine	Adaptive and Robust Control of DFIG-Based Wind Energy Conversion System Using Fuzzy Logic	University of M'sila
257	Mohammed Soufiane Chekembou	Assessment of FACTS Devices for Enhancing Stability in Solar Photovoltaic Integrated Power Systems	University of Laghouat
64	Mohammed Lakhdar Nebbar	Transfer of the charge dissipated by a hydraulic jump to electrical energy	University of M'sila
153	Bensehil Ilhem	First-principles study of lead-free double perovskite Cs2SiBr6 for solar cells and renewable energy	University of M'sila
222	Zemouri Nahed	Improved Solar Energy Prediction via Linear Fusion of Multiple Machine Learning Models.	University of M'sila
05	Ammi Hadjer	Structural and electronic properties of complex hydrides XAlSiH (X = Sr, Ca, and Ba) intended for hydrogen storage: an ab-initio study	University of Bouira
211	Hadda Tiouiri	Calculations of the Structural, Electronic, Optical, and of CdSiX2 (X ¼ P, As) Compounds Based on First-Principles Theory	University of M'sila

Tuesday, May 6th 2025

• Online Session 1 (ROM 1,2,3,4,5) / Time :16 :00-18 :00

ROOM 01 / Google meet Link: https://meet.google.com/xpi-mgig-mbw
Topic: Advanced control of Electric Machines
Chairs: Dr. Kada BOUREGUIG & Dr. GUICHI Amar

Time	Paper	Author	Title	Establishment
16 :00-16 :15	ID 190	Khaled SAHRAOUI	Speed Sensorless Sliding Mode Control of DSIM using MRAS and Extended Luenberger Observer	University of Laghouat
16 :15-16 :30	ID 113	Hamoudi Yanis	Virtual Voltage Vector Predictive Power Control for Dual-Star Induction Machine WECS	University of Bejaia
16 :30-16 :45	ID 35	Imad Eddine Harzelli	Online detection of broken rotor bar faults in induction motors using a model-based approach integrated with input-output feedback linearization control	University of BISKRA
16 :45-17 :00	ID 49	Imad Eddine Harzelli	Electromagnetic Torque Analysis for Diagnosing Static Air-Gap Eccentricity Fault in Squirrel Cage Induction Motors	University of BISKRA
17 :00-17 :15	ID 17	Mabrouk Younes Abdelbadie	Contribution to the harmonic analysis of a classic DTC control and that with a reduced switching table applied to an IM	University of Laghouat
17 :15-17 :30	ID 209	Sofiane Brahami	Improved Sliding Mode Control Using Field-Oriented Control of Three Phase Induction Motor	University of Bejaia
17:30-17 :45	ID 168	Fayçal HASSAINI	New mathematical models of DSPMSM considering neutral points configuration	University of Bejaia
17:45 - 18:00	ID 19	Toumi Djaafar	Implementation of PSO, P&O and INC algorithm on MPPT PV System using Arduino	University of El oued

ROOM 02 / Google meet Link: https://meet.google.com/ota-scus-mxr
Topic : Advanced control of Electric Machines
Chairs : Dr. Abdelbasset BARKAT & Pr. Izzeddine CHALABI

Time	Paper	Author	Title	Establishment
16 :00-16 :15	ID 107	Oualid Djoudi	Field-oriented control versus direct flux-vector control for stand-alone DFIG-based wind power system	University of Bejaia
16 :15-16 :30	ID 27	KHADAR Saad	Advanced sensorless control method based on a genetic algorithm	University of Djelfa
16 :30-16 :45	ID 185	Djamel Difi	Enhanced Dynamic Performance of Five-Phase Permanent Magnet Synchronous Machines through Space Vector Modulation-Based Vector Control	Higher National School of R E, Batna, Algeria
16 :45-17 :00	ID 85	Hamdane Houssem	Effectiveness of Vibration analysis in detecting Mechanical faults in an Induction machine using FFT and DWT techniques	University of Annaba
17 :00-17 :15	ID 73	Mohamed Haithem LAZREG	Optimization-Based Sliding Mode Control of Permanent Magnet Synchronous Motor Using GWO Algorithm	University of Tlemcen

17 :15-17 :30	ID 186	Mohamed Haithem LAZREG	High-Performance MPPT of Permanent Magnet Synchronous Generators Using Sliding Mode Control	University of Tlemcen
17:30-17 :45	ID 95	Alili Zakaria	Revolutionizing Sensorless BLDC Motor Control: A Novel Back-EMF Observation Technique for Precise Speed Management Across All Ranges	University of M'sila
17:45 - 18:00	ID 41	ghezouani abdelkader	Finite time control design for solar water pumping system with induction motor	University of Bechar

ROOM 03 / Google meet Link: https://meet.google.com/bhf-viyv-zxh

Topic : Microelectronics, Electromagnetics and Telecommunications

Chairs : Pr. Slimane BENMAHMOUD & Dr. Fayssal OUAGUENI

Time	Paper	Author	Title	Establishment
16 :00-16 :15	ID 179	Seghiour Rima	Design of a Frequency-Reconfigurable Antenna for 5G Applications	University of M'sila
16 :15-16 :30	ID 93	Maoucha Abdelhak	Toward High-Efficiency, Lead-Free Perovskite Solar Cells: The Role of Gold Nanoparticles and Design Parameters	University of Batna 2
16 :30-16 :45	ID 264	Zineddine Sarhani KAHHOUL	Improving Speech Emotion Recognition: A Control-Based Approach with Spectrograms and Ensemble Voting	University of Biskra
16 :45-17 :00	ID 196	Amal Sila	High Isolation GYSEL Power Divider with fixed characteristic Impedance	University of M'sila
17 :00-17 :15	ID 245	Mecelti Amel	Propagation of self-similar optical solitons in optical medium.	University of Souk-Ahras,
17 :15-17 :30	ID 191	Touaibia soumia	Multimodale soft biometric for predictions gender age and gender	University of M'sila
17:30-17 :45	ID 80	GOUMIDI Mohammed Abdessamad	Multi-Attacks Intrusion Detection and Identification System for Wearable Medical Networks	Université des ST d'Oran
17:45 - 18:00	ID 124	Zohra MEHAR	Modeling and Analysis of Faults in Robotic Machining Cells using Lambda Petri Nets	University of Oran2

ROOM 04 / Google meet Link: https://meet.google.com/ege-uifg-cve

Topics : Electric vehicles technologies/Automatic and robotics

Chairs : Dr. Amar Rouag & Dr. Fares KHALFALLAH

Time	Paper	Author	Title	Establishment
16 :00-16 :15	ID 52	Boughezala Hamad Haithem	Performance Analysis of the five phase permanent magnet Synchronous Motor	University of Djelfa
16 :15-16 :30	ID 71	BECHAR Mansour	Control of Induction Motor using Nonlinear PI Controller for Electric Vehicle	University of BECHAR
16 :30-16 :45	ID 53	AOUADJ Norediene	Development of Direct Yaw Moment Control for an Electric Vehicle based on Fuzzy Logic	Higher School (ESGEE), Oran
16 :45-17 :00	ID 133	Nassim Sabri	Electric vehicle fault detection systems	University of USTHB
17 :00-17 :15	ID 187	OULAD LAID Fatima Zohra	DairAI: AI-based firefighting system using drones for fire prediction, detection, and fighting	University of Ghardaia

17 :15-17 :30	ID 25	RAHAL Mohamed Ilyas	IoT-Driven Automatic Bottle Filling and Capping System Using Arduino	University of Annaba
17:30-17 :45	ID 228	MADDI Zakari	Performance Enhancement of Squirrel Cage Induction Motors Using a New Deep-Slot Design	University of Bejaia
17:45 - 18:00	ID 262	Loubna KHELLAF	Performance Comparison of Conventional and PID-Enhanced MPPT Strategies for Photovoltaic Systems under Environmental Variations	National Higher School of Technology and Engineering - Annaba

ROOM 05 / Google meet Link: https://meet.google.com/nhn-rmmm-azb

Topic : Power electronics and Smart Grid

Chairs : Dr. Chouaib AMMARI & Dr. Salah KHENNOUF

Time	Paper	Author	Title	Establishment
16 :00-16 :15	ID 166	Bousnoubra Choayb	Mitigation of Voltage Disturbances Using Series Active Power Filter	University of Souk-Ahras
16 :15-16 :30	ID 145	Belkacem Houara	FS-MPC And Fuzzy Logic Technics Applied To A Grid-Connected Photovoltaic System	University of Oum El Bouaghi
16 :30-16 :45	ID 218	Zakaria REGUIEG	Smart Voltage Regulation with PV-Based DVR Using Load Voltage Control	University of Chlef
16 :45-17 :00	ID 242	Samir Kennouche	Hybrid PSO-FVSI Approach for Loadability Enhancement in Transmission Networks Under Voltage and Losses Constraints	University of Bejaia
17 :00-17 :15	ID 210	AZAIZIA Zoubida	Geometric Method for Reducing Peak Surface Stress in 60kV XLPE Cable Terminations	Ecole Nationale Polytechnique of Algiers
17 :15-17 :30	ID 22	Mohamed Tayeb Boussabeur	Quasi Z-Source Inverter Using a Simple Boost Control Technique	University of Biskra
17:30-17 :45	ID 72	Si Youcef Hamza	Performance Comparison of PI and Fuzzy PI Controllers in Multilevel DC-DC Boost Converters for Enhanced Voltage Regulation in Telecom Power Systems	Univercity of Mascara
17:45 - 18:00	ID 116	Chahrazed Boucetta	Impact of PCM Distribution on Heat Transfer Efficiency in Hydrogen Storage Reactors	University of Oum El Bouaghi

• Online Session 2 (ROM 1,2,3,4,5) / Time :18 :00-20 :00

ROOM 01 / Google meet Link: https://meet.google.com/yow-afcy-vtb

Topic : Renewable Energy and Green Hydrogen

Chairs : Dr. Abdeloudoud LOUKRIZ & Dr. Zine elabidine DAHMANE

Time	Paper	Author	Title	Establishment
18 :00-18 :15	ID 39	Youcef Maalem	Performance Optimization and Organic Fluids Selection of Solar Thermal Electric Generation	Ecole Nationale Polytechnique de Constantine
18 :15-18 :30	ID 55	Chafa mohamed	Implementation of PWM Control for Static Converters used in Photovoltaic Solar Systems	University of constantine 1
18 :30-18 :45	ID 127	Baala Seddik	Fuzzy Logic MPPT for Solar PV Systems: Intelligent Control for Maximum Energy Harvesting	University of Adrar
18 :45-19 :00	ID 204	OUINTEN Mohammed	Design and implementation of an electronic load for characterizing photovoltaic modules	University of M'sila
19 :00-19 :15	ID 220	Houcem achouri	Artificial Neural Network Controller For Magnetic Gear Generator For Wind Power System	University of Setif 1
19:15-19 :30	ID 83	YOUNES Abdelbari	Studying lightning strikes in wind turbines with square-shaped grid grounding systems	University of Tiaret
19:30-19 :45	ID 07	Messaoud SANDALI	Harnessing Solar Energy for Efficient Drying of Clay Bricks	University of Ouargla
19:45 - 20:00	ID 34	Guendouz Atika	From Structure to Spintronics: A Comprehensive Study of LiNpO3 Perovskite	University of Oran1

ROOM 02 / Google meet Link: meet.google.com/fnu-waav-wrz

Topic : Renewable Energy and Green Hydrogen

Chairs : Dr. Moufdi HADJAB & Dr. Mohamed Assam OUALI

Time	Paper	Author	Title	Establishment
18 :00-18 :15	ID 37	Drici Manal	Performance Evaluation of Renewable Hybrid Distributed Generation System Using the Smell Agent Optimization Technique	University of Annaba
18 :15-18 :30	ID 75	lasri aymen abdellah	Numerical Investigation of Phase Change Materials for Thermal Management in Lithium-Ion Battery Packs Using ANSYS	University of science and technology Oran
18 :30-18 :45	ID 160	Ahmed Faris Amiri	A Comparative Analysis of Regression Models for Predicting PV Power	University of M'sila
18 :45-19 :00	ID 121	Yassmine BOUCHERIT	Modeling and Simulation of DC Hybrid Renewable Energy Systems for Optimal Performance Using MATLAB/Simulink	University of Constantine 1
19 :00-19 :15	ID 82	Saidi youcef	Evaluating Aggregated Models of DFIGs-based on wind farm under Different Received Wind Speeds	University of Saida
19:15-19 :30	ID 236	Haouari CHARIK	Enhancement of light absorption in thin-film organometal trihalide perovskite solar cells via photon recycling mechanisms	University of M'sila
19:30-19 :45	ID 30	Iftissen Nabil	Maximum Power Extraction in Photovoltaic Systems: comparison of P&O and ANN based MPPT algorithms.	University of Médéa

19:45 - 20:00	ID 265	KADI Sara	Enhanced High-Order Sliding Mode Control for Maximum Power Point Tracking in DFIG-Based Wind Energy Systems	USTHB

ROOM 03 / Google meet Link: https://meet.google.com/nit-dtjq-jco

Topic : Renewable Energy and Green Hydrogen

Chairs : Pr. Khatir KHETTAB & Dr. Abdelhafid BENYOUNES

Time	Paper	Author	Title	Establishment
18 :00-18 :15	ID 240	Benatallah Yacine	Design and Simulation of the PV Solar System and MPPT with PI Controller Based on P&O Algorithm	University Centre of EL Bayadh
18 :15-18 :30	ID 165	Mohammed YOUNES	Effect of dust accumulation on degraded PV panels in hot desert climate: a case study	University of Constantine 1
18 :30-18 :45	ID 234	Zahia DJEBLAHI	Identification of the Solar Photovoltaic Parameters Using Mountain Gazelle Optimizer Algorithm	University of Biskra
18 :45-19 :00	ID 100	ZERGLAINE Abdelaziz	Comprehensive Analysis of Electrical Fault Diagnosis in Photovoltaic Arrays	University of CHLEF
19 :00-19 :15	ID 193	CHABNI khadidja	Comparative study and performance evaluation of Different Converter Configurations (String and Centralized) used in Photovoltaic Systems	University of Laghouat
19:15-19 :30	ID 36	Moussa Zohra	Structural, optical, and photocatalytic properties of Fe2O3 thin films prepared by spray pyrolysis	University of Oum El Bouaghi
19:30-19 :45	ID 237	MEZZAI Nabil	Analyzing the Influence of Mismatch Defects and Shading on Photovoltaic Panel Output	Université de Bejaia
19:45 - 20:00	ID 81	Abdel Djabar Bouchaala	Optimal Sizing of a Hybrid Renewable Energy System Using Different Optimization Techniques	University of Skikda

ROOM 04 / Google meet Link: https://meet.google.com/ypw-crww-jbm

Topic : Power electronics and Smart Grid

Chairs : Dr. Brahim Gharbi & Dr. Abdelhakim DJALAB

Time	Paper	Author	Title	Establishment
18 :00-18 :15	ID 156	Alla Boukhdenna	Enhanced DC Bus Voltage Regulation Using a Grey Wolf Optimization Tuned PI Controller under Dynamic Load Conditions	National Higher School of Technology and Engineering
18 :15-18 :30	ID 154	Alla Eddine Boukhdenna	A Comparative Study of the Effectiveness of Particle Swarm Optimization and Gray Wolf Optimization Algorithms in MPPT for PV Systems	National Higher School of Technology and Engineering
18 :30-18 :45	ID 144	Zakaria Belboul	Optimal Sizing of an Autonomous Microgrid: A Comparative Study of Two Metaheuristic Optimization Algorithms	University of Djelfa
18 :45-19 :00	ID 140	Meriem Boudjemaa	Load Response of Grid Following and Grid Forming Inverters.	University of Constantine
19 :00-19 :15	ID 87	Hala Lalaymia	Comparative Study of PI and PR Controls for Single Phase Single Stage Grid Connected PV System	École Nationale (ENSTI)
19:15-19 :30	ID 01	Badreddine Bendriss	Smart incorporation of renewable distributed generations for power loss reduction and voltage profile enhancement in radial distribution grids	University of Setif 1

19:30-19 :45	ID 112	Abdelouahad MAY	An innovative predictive control model applied to a grid-connected qZSI based on power compensation	University of Setif 1
19:45 - 20:00	ID 255	Abdelkrim. BENALI	Voice-Controlled Lifting Barrier via Bluetooth-Enabled Smartphone	University Center El Bayadh

ROOM 05 / Google meet Link: meet.google.com/azj-cooy-yoh

Topic : Power electronics and Smart Grid

Chairs : Dr. Mourad ELBAR & Dr. Abdelkader MOHAMMEDI

Time	Paper	Author	Title	Establishment
18 :00-18 :15	ID 104	SOUMEUR Mohammed Amine	Optimization of energy management system Using ECMS and EEMS strategies for a standalone fuel-cell hybrid power system	Higher Normal school of Bechar
18 :15-18 :30	ID 56	Khames Walid	High-Performance Continuous Query Processing for Big Data Streams: GPU-Optimized Skyline Queries for Traffic Monitoring and Route Optimization	University of Blida1
18 :30-18 :45	ID 163	HAMDAD Sadjia	Forecasting Hydrological Regimes Using Markov Chains to Optimize Water Resource Management in the Context of the Eco-Energy Transition	University of Tizi-Ouzou
18 :45-19 :00	ID 200	Khelil Mohamed Imed	Anomaly Detection Based on DBSCAN clustering approach for Water Quality Assessment.	University of M'sila
19 :00-19 :15	ID 120	Yaakoub Diboune	Application of Lissajous curves for fault detection and analysis in Doubly-fed induction generators	University of Blida 1
19:15-19 :30	ID 108	Kimi Imad Eddine	Real-time Monitoring of Pariculate Triboelectric Charge Using Throughout-type Faraday Cup: Simulation and Experimental Analysis	Ecole Normale Supérieure de Bechar
19:30-19 :45	ID 40	Bouchikhi Nasreddine	Impact of Distributed Generation Placement and Sizing on Short-Ciruit Levels in Radial Distribution Networks	University of Setif 1
19:45 - 20:00	ID 135	Lahrech Abdelhakim	Thermal Performance Evaluation of a Tri-Nanofluid in a Water–Ethylene Glycol Base Fluid: Analysis of Heat Transfer, MHD Flow, and Double-Diffusive Convection in a Porous Medium under Thermal Non-Equilibrium and Joule Heating effect	University of Bordj Bouarreridj

• Virtual Poster (Off line)

Chairs : Dr. Abderrahim ZEMMIT & Dr. Abdelghafour Herizi & Dr. Riyadh ROUABHI			
ID	**Author**	**Title**	**Establishment**
195	Abderrahmane BENAISSA	Comparative Study of Current Ripple and Efficiency in Interleaved and Conventional Boost Converters for Photovoltaic Energy Integration	University of Djelfa
159	Abderrahmane BENAISSA	Bidirectional Energy Transfer for Electric Vehicles: A V2G/G2V Converter System	University of Djelfa
21	Chehda Rabeh	Discrimination between inter-turn short-circuit and eccentricity faults in SRM using real and imaginary components of stator current spectral analysis	University of Tiaret
174	Grine Madani	Ab-initio study of the optoelectronic properties of ZnX for use in renewable energy, such as photovoltaic cells	University of M'Sila
92	Mohamed Boudiaf Koura	Enhanced Diagnosis of Rotor Faults in Induction Motors Using Adjustable Window Function	University of Tiaret
151	ZOUGHAB Samir	An efficient control based on VSS-P&O MPPT technique for a Standalone Photovoltaic Water Pumping System Using a PMDC Motor	University of Setif 1
58	LATRECHE Abderrezzak	Hybrid Renewable Sources Implementation for a DC Microgrid with MPPT Fuzzy Logic Control	University of Tamanghasset
199	LATRECHE Abderrezzak	Simulation of a Hybrid Fuel Cell and Battery Storage System in MATLAB	University of Tamanghasset
101	Lakhdar MADANI	Analysis of the impact of wind turbine integration on system security and protection planning	University of Setif 1
106	Mammi Mounira	Elaboration and Characterization of Doped NiO Thin Films Prepared by Spray Pyrolysis and Their Application in Gas Sensor Devices	University of El Oued
67	Mohammed Boukhari	Field-Oriented Control of Dual Front-Wheel Motors in Electric Vehicles	University of M'sila
77	MOKHTARI Rida	Real-Time Attitude Control of a Quanser Quadrotor Using Finite-time Algorithm and Quaternion Representation	école supérieur en sciences appliquées de Tlemcen
33	Ayyoub Zeghlache	Super-Twisting Sliding Mode Observer and Extended State Observer Comparison in PMSM Sensorless Control	University of M'sila
192	Zine elabadine Dahmane	Vehicle-to-Grid (V2G) Integration for Balancing Renewable Energy Supply	University of USTHB
230	MOKHTARI Rida	Autonomous Flight Control Systems for Small Coaxial Rotor UAVs	école supérieur en sciences appliquées de Tlemcen