

CIYCEE 2023

CHINA INTERNATIONAL YOUTH CONFERENCE ON ELECTRICAL ENGINEERING

The 4th China International Youth Conference on Electrical Engineering

December 08-10, 2023 Chengdu, China

**CONFERENCE
BROCHURE**



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ABOUT CIYCEE

Conference Concept

China International Youth Conference on Electrical Engineering is an integrated platform for the young students and professionals all over the world to investigate the future electrical engineering technologies. It emphasizes both the traditional and novel sub-fields under electrical engineering, including power energy, power electronics, electrical machine and drive, electromagnetism and so on. Following the spirit of IEEE IAS, linking research to practice, leading industry and academic experts in these fields will be invited to present latest technical achievements and share practical experience to the participants.

Conference Sponsors

In this year of 2023, the conference is organized by the IEEE IAS Student Branch Chapter of Southwest Jiaotong University (SWJTU), and co-organized by IEEE PELS Student Branch Chapter of University of Electronic Science and Technology of China (UESTC). Both IEEE IAS Student Chapter of SWJTU and School of Electrical Engineering of SWJTU will technically and financially sponsor this conference.

Participants and Technique aspects

Papers accepted by CIYCEE 2023 will be published by IEEE in conference proceedings, submitted to **IEEE Xplore** and **EI** for indexing, and excellent papers will be recommended to **IEEE Transactions on Industry Application** for review!

Technical papers are solicited on any subject pertaining to the scope of the conference, which includes, but is not limited to the following major topics:

- Renewable energy system
 1. Low carbon and carbon-neutral technology
 2. Renewable energy system planning, design, and operation
 3. Energy storage system application
 4. Other topics in renewable energy
- Power electronics technology and application
 1. Power converter topologies and design
 2. Modeling, simulation and control in power electronics
 3. Fault diagnosis and tolerance control of power electronic equipment
 4. Wide bandgap semiconductor technology
 5. Other topics in power electronics

- Power system and automation
 1. Modeling, control and stability analysis in power system
 2. Power system fault simulation and risk assessment
 3. Smart grid and utility applications
 4. Other topics in power system
- High voltage and insulation technology
 1. High voltage testing and measurement
 2. Sensing, monitoring and diagnostics
 3. High Voltage insulation technologies
 4. Other topics in high voltage and insulation technology
- Wireless power transfer technology
 1. Theories and techniques for wireless power transfer
 2. Devices and systems for short-distance wireless power transfer
 3. Other topics in wireless power transfer
- AI-driven technology
 1. Intelligent Anomaly Detection, Fault Diagnosis and Prognostics
 2. Intelligent sensing and data analytics for smart manufacturing
 3. Advanced sensing and intelligent computation
 4. Fault prognosis and life prediction
- Electric Machine Design and Control
 1. Electric machine design
 2. Electric machine control
 3. Other topics in electric machine

Conference Agenda

The 4th CIYCEE will be held on Dec.8th~10th in Southwest Jiaotong University (SWJTU), Chengdu, China. This Conference will host multiple oral presentation and poster presentation sessions. All accepted papers will be presented in oral or poster sessions. Paper digest and poster abstract submissions are peer-reviewed. Conference content will be submitted for inclusion into IEEE Xplore as well as other Abstracting and Indexing (A&I) databases.



Greeting Letter from General Chair

Dear Esteemed Conference Participants,

I trust this message finds you well and in good spirits. As the Chair of the 4th China International Youth Conference on Electrical Engineering (CIYCEE 2023), it is both an honor and a pleasure to extend my heartfelt greetings to each of you.

The 4th CIYCEE will be held on Dec. 8th~10th in Chengdu, China. In this year of 2023, the conference is organized by the IEEE IAS Student Branch Chapter of SWJTU, and co-organized by IEEE PELS Student Branch Chapter of University of Electronic Science and Technology of China (UESTC). Both IEEE IAS Student Chapter of SWJTU, IEEE PELS Student Branch Chapter, and School of Electrical Engineering of SWJTU will technically and financially sponsor this conference.

The IEEE CIYCEE aims to provide the forum for the young students and professionals around the world to investigate the future electrical engineering technologies. It emphasizes both the traditional and novel sub-fields under electrical engineering, including renewable generation, machines, system control, stability, high voltage technology and so on. Following the spirit of IEEE IAS and linking research to practice, we will invite leading industry and academic experts in these fields to present latest technical achievements and share practical and valuable experience to the participants.

Your dedication to advancing knowledge and contributing to the academic community is truly inspiring. Your participation in this conference signifies a shared commitment to the pursuit of excellence in research and scholarship.

Throughout the conference, I look forward to engaging in meaningful discussions, fostering connections, and collectively contributing to the rich tapestry of ideas that will unfold during our time together. Your diverse perspectives and expertise will undoubtedly make this conference a dynamic and intellectually stimulating experience for everyone involved.

Once again, thank you for your valuable contributions and for being an integral part of this academic journey. I am eager to meet and connect with each of you.

Best regards,

Bing Lu Yubo Han

Bing Lu, Yubo Han,

General Chairs of IEEE CIYCEE 2023

Organizing Committee

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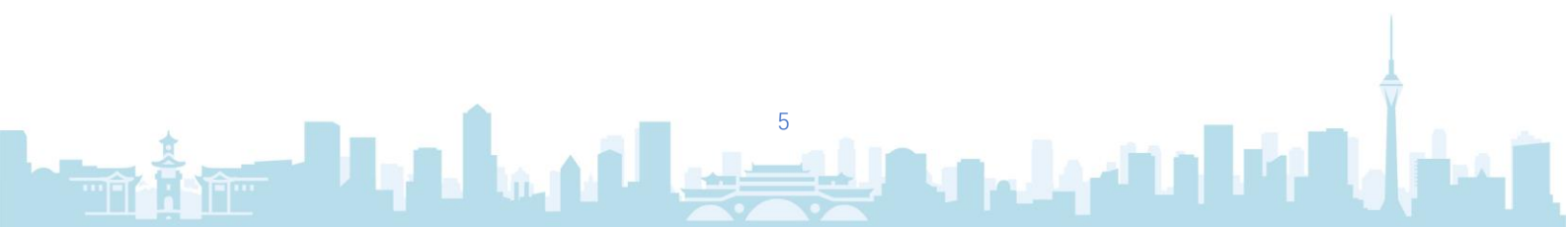
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Notices to Participants

1. Eligibility for Conference Proceedings

- 1) Participants should submit a final version of the accepted paper meeting all the format requirements and revised according to review comment.
- 2) Participants should upload the oral or poster presentation video and other required material. The oral speakers must attend the assigned oral session for Q&A.
- 3) Participants should complete the registration and payment.
- 4) Participants should sign the IEEE e-copyright agreement.

Notice: Violating any of the above will be considered as no show in the virtual conference, and the paper will be removed from the conference proceedings without refund.

2. Oral Session

- 1) Preparing your Oral presentation

Presentation for oral sessions requires a PPT, which can last up to 15 minutes. We recommend the 4:3 format for better screen showing. Presentation in 16:9 format is acceptable as well. An excellent tool to create a PPT is directly using the office PowerPoint.

- 2) PPT submission

Whether you are an online or offline participant, please submit your PPT to the conference website no later than **December 1st**. Please ensure that you adhere to this deadline, as late submissions will not be accepted. **The name of the file MUST be the Paper ID (Three Digits)**. For example "201.ppt".

Manner to submit presentation material:

Step 1: Log in your account in <http://ciycee2023.aconf.cn/control.php/index.html>;

Step 2: Click "Dashboard";

Step 3: Click "My presentation" under "Presentation", then you will find your information about the presentation;

Step 4: Click "File" where you can upload your files for presentation (PowerPoint for all participants with oral presentations)

Note: Accepted paper without presentation will be considered as absent in the conference, and the paper will be removed from the conference proceedings without refund.

- 3) More requirements: <http://ciycee2023.aconf.cn/Programme.html>

3. Poster Session

1) Preparing your Poster presentation

Create your posters within one page.

2) Poster submission

Online Participants with Poster Presentations:

Submit the electronic version of your poster in the dashboard page of the conference website no later than December 1st. The name of the file **MUST** be the Paper ID (Three Digits). Please ensure that you adhere to this deadline, as late submissions will not be accepted. Please note that the dimensions of the poster display stand are 0.9 m (width) × 1.2 m (height). Your poster should be in electronic format and meet the specified guidelines provided by the conference committee.

Manner to submit presentation material:

Step 1: Log in your account in <http://ciycee2023.aconf.cn/control.php/index.html>;

Step 2: Click “Dashboard”;

Step 3: Click “My presentation” under “Presentation”, then you will find your information about the presentation;

Step 4: Click “File” where you can upload your files for presentation (Poster for online participants with poster presentations).

Off-line Participants with Oral Presentations:

Please print your poster in advance and bring it with you to the conference hotel. Please note that the size of poster is 1.2-meter-high by 0.9-meter-wide. The specific time and location for poster setup and display will be communicated to you at a later date. Kindly ensure that your poster meets the required dimensions and guidelines provided by the conference committee.

Note: Accepted paper without presentation will be considered as absent in the conference, and the paper will be removed from the conference proceedings without refund.

3) More requirements: <http://ciycee2023.aconf.cn/Programme.html>

Attendees Guide

♦ *Venue*

Chengdu Runbang International Hotel

(No. 249, Shuhan Road, Jinniu District, Chengdu, Sichuan Province)

成都润邦国际酒店 (四川省成都市金牛区蜀汉路 249 号)

♦ *Sign in*

Time: December 7th, 14:00-22:00

December 8th, 07:30-09:00

Location: The lobby on the first floor of Chengdu Runbang International Hotel

♦ *Weather condition*

Date	Weather	Temperature
Dec.7th		10°C-17°C
Dec.8th		10°C-16°C
Dec.9th		11°C-17°C
Dec.10th		09°C-16°C

♦ *Contact us*

Southwest Jiaotong University (SWJTU)

Add: No.999, Xi'an Road, Pidu District, Chengdu City, Sichuan Province, 611756 China

Conference organize committee contact

Email: ciycee2023@163.com

Aconf Staff: Lu Wei

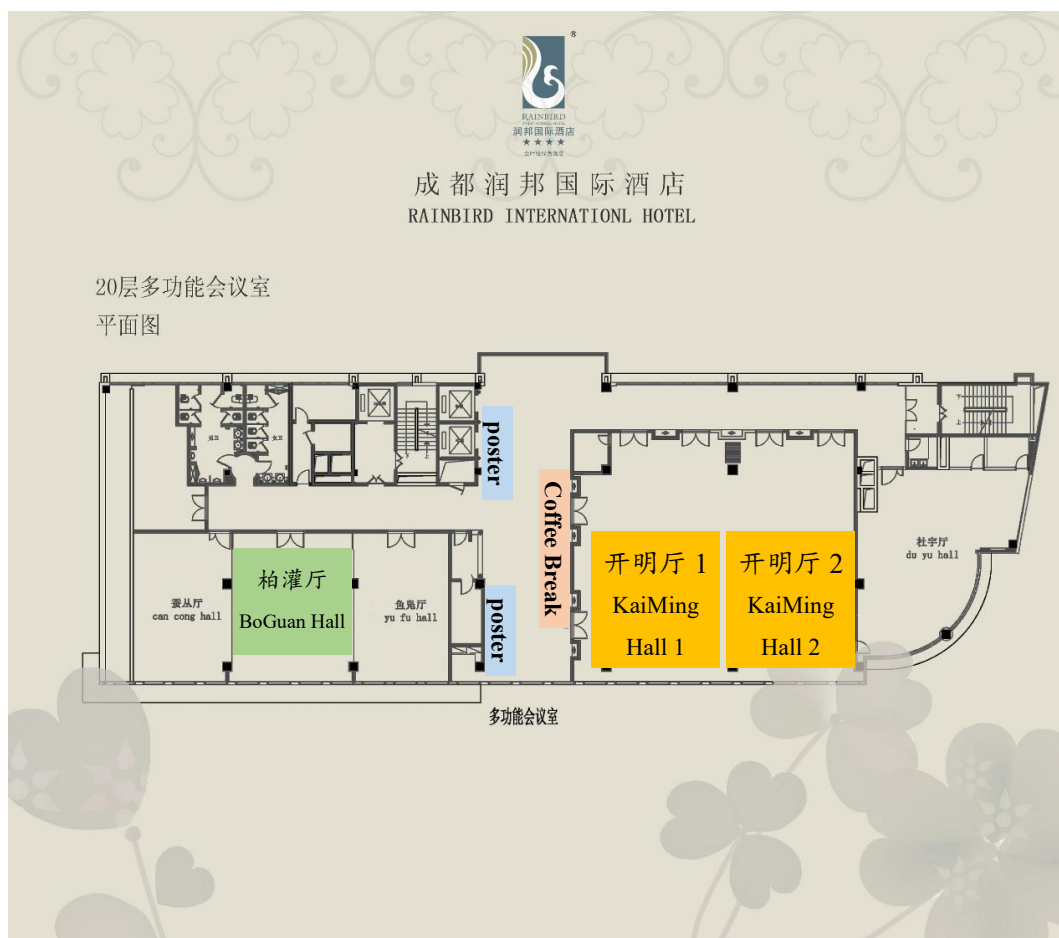
Tel: +86 18971567453

Email: luwei@chytey.com



WeChat public account: IEEE IAS SWJTU Student Branch

◆ Distribution of conference halls



Note:

The Kaiming Hall consists of Kaiming Hall 1 and Kaiming Hall 2;

开明厅由开明厅 1 和开明厅 2 组成;

Meeting room on the 21st floor, please move up to the 21st floor.

21F 会议室请上 21 层。

◆ Traffic information

🚗 Chengdu Tianfu International Airport T2 Terminal → Chengdu Runbang International Hotel

Taxi: The time is 1 hour and 2 minutes, the distance is 69.8 kilometers, about 100 yuan.

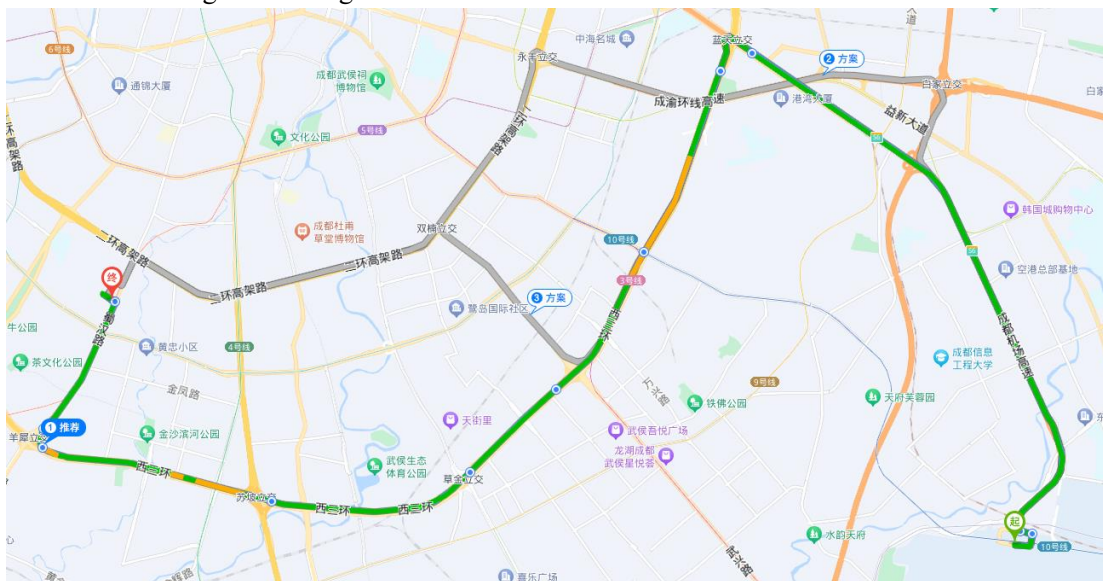
Public transportation: 1 hour and 34 minutes, Chengdu Tianfu International Airport (342 meters walk) → Tianfu Airport Terminal 1 and 2 Subway Station, Line 18 South Railway Station direction (10 stops) → South Railway Station Subway Station → Station transfer → South Railway Station Subway Station, Line 7 Shengxianshu direction (9 stops) → First Class Tianxia Subway Station Exit E → Walk 544 meters to reach the Chengdu Runbang International Hotel.



🚗 Chengdu Shuangliu International Airport T2 Terminal → Chengdu Runbang International Hotel

Taxi: The time is 35 minutes, the distance is 23.8 kilometers, and the taxi is about 31 yuan.

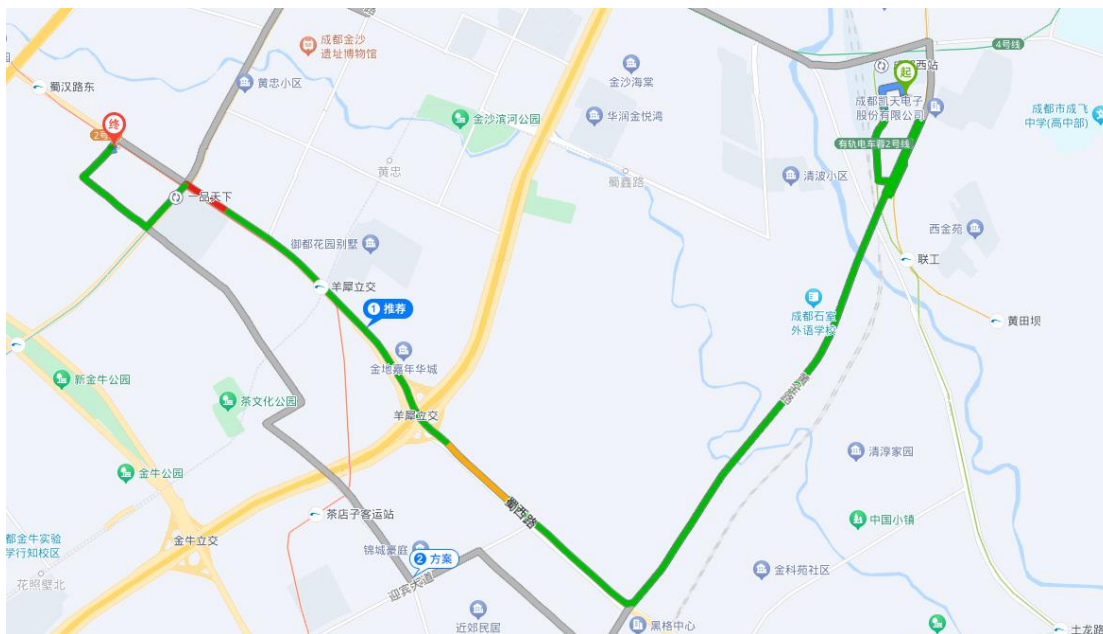
Public transportation: 48 minutes, Chengdu Shuangliu International Airport T2 Terminal (155 meters walk) → Shuangliu Airport 2 Terminal Subway Station Line 10 towards Taipingyuan (5 stations) → Taipingyuan Subway Station → Station transfer → Taipingyuan Subway Station Line 7 towards Wuhou Avenue (6 stations) → Yipin Tianxia Subway Station Exit E → Walk 544 meters to reach the Chengdu Runbang International Hotel.



🚗 Chengdu West Railway Station → Chengdu Runbang International Hotel

Taxi: It takes 16 minutes by taxi, the distance is 7.5 kilometers, and it costs about 12 yuan.

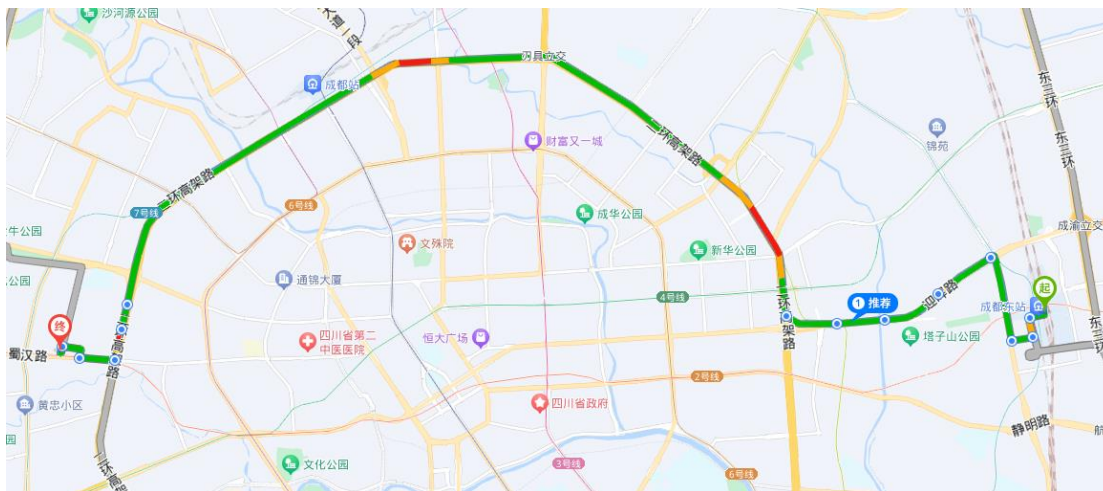
Public transportation: 32 minutes, Chengdu West Railway Station (343 meters walk) → Chengdu West Railway Station Subway Station, Line 4 Xihe direction (two stops) → Cultural Palace Subway Station → transfer to → Cultural Palace Subway Station Line 7 Jinsha Museum direction (two stops) → Yipin Tianxia Subway Station Exit E → walk 544 meters to the Chengdu Runbang International Hotel.



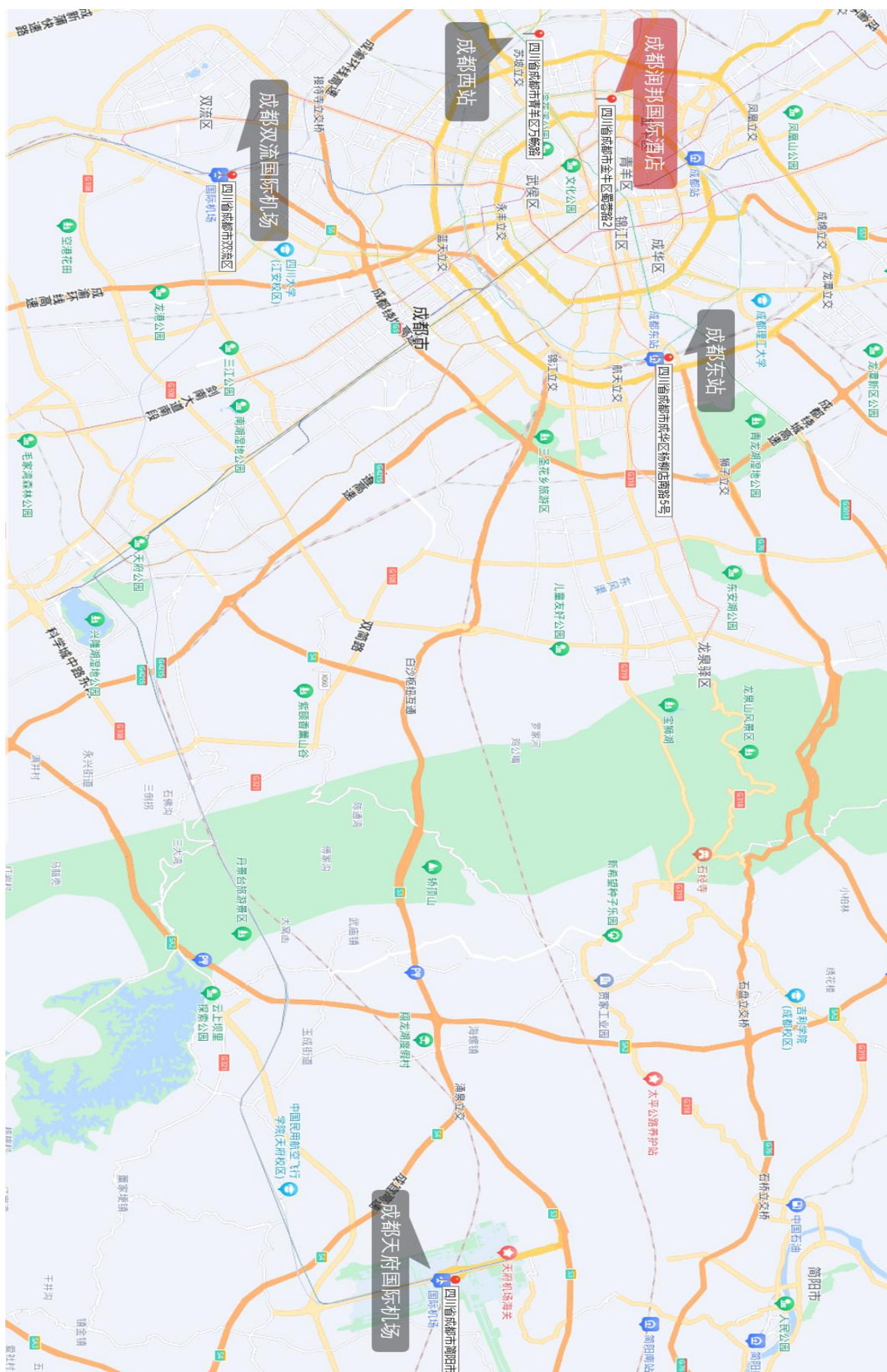
🚗 Chengdu East Railway Station → Chengdu Runbang International Hotel

Taxi: 27 minutes by taxi, 17.3 kilometers, about 23 yuan.

Public transportation: 38 minutes, Chengdu East Railway Station (281 meters walk) → Chengdu East Railway Station Subway Station → Chengdu East Railway Station Metro Station → Xipu direction of Line 2 (12 stations) → Shuhan Road East Subway Station Exit F → 10 minutes' walk to the Chengdu Runbang International Hotel.



◆ Transportation Overview



Schedule-at-a Glance

● Agenda for December 8th

4th China International Youth Conference on Electrical Engineering			
Friday, December 8, 2023			
09:00-09:30	开幕式		开明厅
09:30-10:00	Keynote speakers	<i>Weihaio Hu</i> Artificial Intelligence and its Application in Renewable Energy Systems	Tencent Meeting Number: 410-569-309
10:00-10:20	Coffee break		
10:20-10:50	Keynote speakers	<i>Kai Sun</i> Advanced Bi-directional DC-DC Converters in Battery Energy Storage Systems	开明厅 Tencent Meeting Number: 410-569-309
10:50-11:20		<i>Kai Zhou</i> A Soft Fault Location Method for Power Cable Based on Frequency Domain Reflection with AR Model	
11:20-11:50		<i>Yang Han</i> Modeling and Control of Power Electronic Converters for Microgrid Applications	
11:50-13:30	Lunch		
13:30-14:00	Special Session	<i>Song Yang</i> Current Collection Performance of High-speed Rail Pantograph-catenary System for 400 km/h and above	开明厅 Tencent Meeting Number: 725-170-710
14:00-14:30		<i>Leijiao Ge</i> Distributed optimization control method of voltage in intelligent distribution network with high proportion photovoltaic driven by grid-connected inverters under time-delay	
14:30-15:00		<i>Yonghui Liu</i> Stability Analysis of the Grid-Forming Converter in Current Limiting Mode	
15:00-15:30		<i>Zongsheng Zheng</i> Intelligent Enhancement Technology for Wideband Oscillation Disturbance Source Localization in Power Systems	

15:30-15:50	Coffee break			
15:50-16:20	Special Session	Cancan Rong Research on the mechanism of shielding metamaterials in wireless power transfer system	开明厅 Tencent Meeting Number: 725-170-710	
16:20-16:50		Yuanhong Tang Research on Optimized Modulation Strategy of Dual Active Bridge DC-DC Converter		
16:50-17:20		Yefei Xu Research on efficiency improvement technology for IPT systems using reconfigurable circuits		
17:20-17:50		Hongjian Lin A Fault Diagnosis Method for Cascaded H-Bridge Multilevel Converters		

● **Agenda for December 9th**

4th China International Youth Conference on Electrical Engineering				
Saturday, December 9, 2023				
09:00-10:15	开明厅 1 (Tencent Meeting Number: 454-287-605)	开明厅 2 (Tencent Meeting Number: 800-629-010)	柏灌厅 (Tencent Meeting Number: 705-462-090)	走廊展架
	Session1: Renewable energy system	Session2: Power electronic technology and application	Session4: Power system and automation	Poster session: Session1, Session2, Session4
10:15-10:30	Coffee break			
10:30-12:00	开明厅 1 (Tencent Meeting Number: 454-287-605)	开明厅 2 (Tencent Meeting Number: 800-629-010)	柏灌厅 (Tencent Meeting Number: 705-462-090)	走廊展架
	Session1: Renewable energy system	Session2: Power electronic technology and application	Session4: Power system and automation	Poster session: Session1, Session2, Session4

12:00-14:00	Lunch				
	开明厅 1 (Tencent Meeting Number: 113-587-398)	开明厅 2 (Tencent Meeting Number: 949-992-408)	柏灌厅 (Tencent Meeting Number: 114-921-793)	21F 会议室 (Tencent Meeting Number: 881-154-173)	走廊展架
14:00-15:45	Session3: High voltage and insulation technology	Session5: Traction power supply technology and application	Session6: 5G and Wireless power transfer technology	Session7: Power system protection and control	Poster session: Session3, Session5, Session6, Session7
15:45-16:00	Coffee break				
	开明厅 1 (Tencent Meeting Number: 113-587-398)	开明厅 2 (Tencent Meeting Number: 949-992-408)	柏灌厅 (Tencent Meeting Number: 114-921-793)	21F 会议室 (Tencent Meeting Number: 881-154-173)	走廊展架
16:00-17:30	Session3: High voltage and insulation technology	Session5: Traction power supply technology and application	Session6: 5G and Wireless power transfer technology	Session7: Power system protection and control	Poster session: Session3, Session5, Session6, Session7

● Agenda for December 10th

4th China International Youth Conference on Electrical Engineering				
Sunday, December 10, 2023				
09:00-10:15	开明厅 1 (Tencent Meeting Number: 751-859-918)	开明厅 2 (Tencent Meeting Number: 406-246-752)	柏灌厅 (Tencent Meeting Number: 371-876-814)	走廊展架
	Session8: AI-driven technology	Session9: Transformer technology and applications	Session10: Electric Machine Design and control	Poster session: Session8, Session9, Session10
10:15-10:30	Coffee Break			
10:30-12:00	开明厅 1 (Tencent Meeting Number: 751-859-918)	开明厅 2 (Tencent Meeting Number: 406-246-752)	柏灌厅 (Tencent Meeting Number: 371-876-814)	走廊展架
	Session8: AI-driven technology	Session9: Transformer technology and applications	Session10: Electric Machine Design and control	Poster session: Session8, Session9, Session10
12:00-14:00	Lunch			
14:30-15:30	开明厅 (Tencent Meeting Number: 452-911-951) Closing ceremony			

Oral Sessions

Session1: Renewable energy system

Session2: Power electronic technology and application

Session4: Power system and automation

Time: Sat 9/12 9:00-12:00

● Session 1

Moderator: Jingwei Liu

System ID	Time	Paper	Author
20	09:00~09:15	Coordinated Day-ahead and Intra-day Operation of Distribution Networks Considering the Active Support of Distributed PV and Energy Storage System	Qingyan Zhang
37	09:15~09:30	Game-Based Offshore Wind Farm Cluster Transmission System Topology Design	Siyu Tao
49	09:30~09:45	Analysis on Dynamic Characteristics of Wind Power Systems	Jianyong Zhan
84	09:45~10:00	Time Series Prediction of day-ahead Photovoltaic Power Based on Data-Driven	Mingyue Zhang
86	10:00~10:15	A Capacity Configuration Model for User-Oriented Photovoltaic Energy Storage System	Haojie Ma
--	10:15~10:30	Coffee Break	
119	10:30~10:45	Optimal Operation of Energy Storage Units with Efficiency Improvement and State of Charge Balance	Xiangchen Zhu
145	10:45~11:00	Mechanical and Thermal Analysis of a 5MW Double-Stator Single-Rotor PMSG for Direct Offshore Wind Turbines	Warda Gul
156	11:00~11:15	Control Strategy of Hybrid Distribution Transformer with Photovoltaic Power and Energy Storage	Shichao Li
202	11:15~11:30	Online Parameter Tuning Method for Frequency Droop Control of Wind Turbine Generator	Tongxin Chen

● **Session 2**

Moderator: Guiyang Hu

System ID	Time	Paper	Author
2	09:00~09:15	Analysis and Design of Bidirectional Multilevel CLLLC Resonant Converter	Yuchen Fang
8	09:15~09:30	Dual-Resonant Step-Up AC/DC Converter Based on Fixed Frequency Pulse Overlapping Modulation	Yubo Han
40	09:30~09:45	A Novel Boost PFC Converter with Inherent Boundary Conduction Mode Operation	Song Lu
47	09:45~10:00	Enhanced Particle Filtering-Based Lifetime Prediction for IGBT in High-speed Trains	Zhang Kunpeng
76	10:00~10:15	A New Driving Compensation Strategy to Improve Current Symmetry of Integrated Buck-Boost-LLC Converter	Jin Wen
--	10:15~10:30	Coffee Break	
80	10:30~10:45	Research on vehicle rectifier control strategy based on reinforcement learning	Mingwei Tang
97	10:45~11:00	Suppression Method of Modulation Switching for the Inverter Oscillation caused by Harmonic Control	Deshuo Yu
108	11:00~11:15	A Unified Model to Compare Stability of VSG and Current-Controlled Inverter Connected to Weak Grid	Yihan Xie
112	11:15~11:30	A Modeling and Control Method for Modular Multilevel Matrix Converter in Fractional Frequency Transmission Applications	Jinyang Gao
120	11:30~11:45	Analysis of the DC-link Capacitor Ripple Current for Neutral-Point-Clamped Three Level Inverter	Xiaosa Sui

● **Session 4**

Moderator: Lite Xu

System ID	Time	Paper	Author
13	09:00~09:15	Optimal allocation of static and dynamic charging facilities for electric vehicles	Jingjie Yao
16	09:15~09:30	A Subzone Formation Strategy for Load Restoration in Resilient Distribution Systems	Jihang Cheng
28	09:30~09:45	Simulation Analysis of Intermittent Arcing Ground Faults in Urban Distribution Networks	Wang Ge
81	09:45~10:00	Microgrid Cybersecurity: Addressing Challenges and Ensuring Resilience	Chaofeng Yan
89	10:00~10:15	Dynamic Ripple Tracking Method in DC Distribution Network	Hongyan Li
--	10:15~10:30	Coffee Break	
127	10:30~10:45	Research on Structural Heterogeneity of Power Network with Electric Vehicle Charging Load	Yeqing Zhang
208	10:45~11:00	Spatio-temporal Flexibility Evaluation of Electric Taxi Fleets Using Taxi Travel Data in Beijing	Xiaoyu Duan
211	11:00~11:15	Optimal Placement of Phasor Measurement Unit in Active Distribution Network considering Uncertainty and Soft Open Point	Ruoyan Wang

Session3: High voltage and insulation technology

Session5: Traction power supply technology and application

Session6: 5G and Wireless power transfer technology

Session7: Power system protection and control

Sat 9/12 14:00-17:30

● **Session 3**

Moderator: Xiangyu Shan

System ID	Time	Paper	Author
15	14:00~14:15	Research on Inverse Design of Electromagnetically Induced Transparency Metamaterials Based on Generative Adversarial Network	Xingyu Zhou
67	14:15~14:30	Inverse design of EIT metamaterials based on autoencoder with reconstruction error	Peishuai Tian
78	14:30~14:45	Dynamic behavior characteristics of bubbles in oil under coupling of multiple physical fields	Luyao Liu
83	14:45~15:00	Development of Trigger Source for Surface-triggered Vacuum Switch	Yuhui Yao
133	15:00~15:15	Research on Digital Diagnosis of Switchgear Based on Integration of Virtuality and Reality	Wendi Ding
135	15:15~15:30	Research of HVAC Novel Fault Current Limiter Electromagnetic Field Coupling Considering the DC Component of Short Circuit Current	Jiawei Liu
143	15:30~15:45	Non-destructive Testing Method for Breakdown Strength of XLPE Cable Insulation: Near-infrared Spectroscopy	Haoran Sui
--	15:45~16:00	Coffee Break	
144	16:00~16:15	Prediction of Elongation at Break of XLPE Cable Insulation by Near-infrared Spectroscopy	Zichao Yang
165	16:15~16:30	Analysis and Design of Multiple relay WPT System Embedded in Composite Insulator	Ruiqing Sun
172	16:30~16:45	Interfacial Breakdown Characteristics and Its Physical Model of Cable Accessories under Multiphysics Fields	Tianfeng Zhang

● **Session 5**

Moderator: Hailong Qiu

System ID	Time	Paper	Author
24	14:00~14:15	FAult Diagnosis for High Speed Railway Traction Network Based on Relief-F for Multi-layer Perceptron	Wenbo Zhou
46	14:15~14:30	Heterogeneous Models Based Distributed Predictive Control for Heavy-haul Trains	Kunpeng Zhang
115	14:30~14:45	Influence of Stray Current on Distance Protection in Rail Transit	Ruxue Zhao
138	14:45~15:00	Nonlinear Intra-multiple Frequency Internal Resonance in Grid-connected Inverters Based on General Forced Oscillations	Bingshu Hou
191	15:00~15:15	A Gate Current Detection for Short-Circuit Protection of SiC MOSFET	Bo Hu
140	15:15~15:30	Design of Post-Assembly Magnetization System of the Rotor of Disk Coreless Permanent Magnet Motor Based on Halbach Array	Xia Li
188	15:30~15:45	Influence of Low Pass Filter on wide-frequency oscillation of Power-electronic-integrated Distributed Generations	Yaqian Yang
--	15:45~16:00	Coffee Break	
102	16:00~16:15	Research on two-dimensional thermal networkof a coreless axial flux permanent magnet synchronous motor for flywheel energy storage	Kexin Yao
169	16:15~16:30	Research on Multi-modal feature extraction and covolutional neural network for deterioration identification of GIS equipment	Lu Lu
174	16:30~16:45	Adaptive Control of Electromagnetic Levitation System Considering Input Unidirectionality and Parameter Uncertainty	Fengxing Li

● **Session 6**

Moderator: Haoyu Wang

System ID	Time	Paper	Author
35	14:00~14:15	Design and Research of Active Inductor for Wireless Power Transfer System	Bole Ma
38	14:15~14:30	2DPSK-based Simultaneous Wireless Power and Data Transfer Using Frequency Division Multiplexing Technique	Guangyu Yan
110	14:30~14:45	Modeling and Analysis of Concrete-air Cross-media Wireless Power Transfer Systems	Kaiping Qu
130	14:45~15:00	A Multiload WPT System with CC/CV Output Based on LCC-S Topology for UAV Clusters	Haibing Wen
146	15:00~15:15	Parameter design method for CCM in Double-Sided LC WPT System	Yongchao Wang
189	15:15~15:30	Research on multi-coils wireless power transfer System Based on Insulator with Flanges	Ruiqing Sun
195	15:30~15:45	Metamaterial/Metasurface-Based Antenna with Improved Gain for Wireless Power Transfer Systems	Naser Ojaroudi Parchin
--	15:45~16:00	Coffee Break	
139	16:00~16:15	Remote Real-time Monitoring System for Power Quality Using 5G Synchronous Waveform Collection	Bin Zhao
198	16:15~16:30	A Lateral Rotation-Free IPT System with Overlapped Receiving Coils for Power Cable Sensors	Wenhui Wang

● **Session 7**

Moderator: Haojie Ma

System ID	Time	Paper	Author
103	14:00~14:15	Circuit Breaker Target Sound Signal Detection Method based on VAD and SVDD Algorithms	Zhencheng Yang
206	14:15~14:30	Interfacial Thermal Resistance Measurement at Polymer/Semiconductor Interface Using Optical-Interference Contactless Thermometry (OICT)	Jiawen Yu
134	14:30~14:45	Non-contact voltage measurement technology based on dual coupling mechanism displacement current method	Ling Fu
164	14:45~15:00	Modelling and Control of the Reconfigurable Converter for the Retired battery	Ning Wang
210	15:00~15:15	Electric Motor Bearing Fault Noise Detection with Mel-Transformer Model and Multi-Timescale Feature Extraction	Chao Gong
100	15:15~15:30	Velocity Control of Electromagnetic Pellet Injection Based on Genetic Algorithm in J-TEXT	Zisen Nie
128	15:30~15:45	Research on vulnerability assessment method of electric power network based on graph neural	Zijian Wan
--	15:45~16:00	Coffee Break	
129	16:00~16:15	Hypergraph modeling and vulnerability assessment of power network	Tian Qi
131	16:15~16:30	Load Frequency Control Strategy for Two-Area Power System Considering Deep Reinforcement Learning Algorithm	YuDong Liang
161	16:30~16:45	A Method Dealing with the Class Imbalance Problem in Transient Stability Assessment: Combining ADCHSMOTE-TL and Lifting Dimension Linear Regression	Tao Liu
123	16:45~17:00	500kV Transmission Tower Safety Assessment under Foundation Erosion by River Water	Li Zhang

Session8: AI-driven technology

Session9: Transformer technology and applications

Session10: Electric Machine Design and control

Sun 10/12 9:00-12:00

● **Session 8**

Moderator: Shujian Zhu

System ID	Time	Paper	Author
1	09:00~09:15	Self-organized Criticality Identification of Power Systems Based on Neural Networks	Yeqing Zhang
3	09:15~09:30	Transient stability assessment of power systems with graph neural networks considering global features	Shengyuan Yang
77	09:30~09:45	Stability Analysis of Co-Phase Traction Power Supply System Based on dq-Frame Impedance	Feifan Liu
87	09:45~10:00	A Novel APF-Type Active Damper for SAPF System with Phase Reshaping	Zhilong Zhang
94	10:00~10:15	Stability Evaluation of the Dual-terminal Structure DC Distribution Power Systems with Multiple DC Transformers	Mengyuan Zhao
--	10:15~10:30	Coffee Break	
95	10:30~10:45	Analysis of the influence of accelerator grid power supply DC bus on output voltage	Zhenchang Du
109	10:45~11:00	Intelligent optimization method for time period of power grid operation based on knowledge model	Gaohan Lu
181	11:00~11:15	Self-Organized Criticality Identification of Power System Based on SC-GCN Network	Zixuan Liu
200	11:15~11:30	An Adaptive Real Coded Population-Based Incremental Learning Algorithm for Design Optimizations in Continuous Space	Shiyou Yang
116	11:30~11:45	Carbon Flow Tracing Method for Power Systems based on Complex Power Distribution Matrix	Wei Tai

● Session 9

Moderator: Wenzhuo Zhao

System ID	Time	Paper	Author
10	09:00~09:15	Study of Transformer Winding Vibration Characteristics under Electromagnetic Field and Structural Force Field	Xiaowen Dai
11	09:15~09:30	An Optimized Light-Load Efficiency Scheme for LLC Converters Based on Variable Ratio Transformer	Tianqi Lv
39	09:30~09:45	Single-Phase Transformer less Two-Leg UPQC with Low DC-Link Voltage and Reduced	Cen Tang
66	09:45~10:00	Correlation analysis between noise and operating parameters of transformers with different rated capacities	Meiying Wu
69	10:00~10:15	Optimal design of 6kw high frequency transformer using AP method	Yanyin Zhou
--	10:15~10:30	Coffee Break	
88	10:30~10:45	Modeling of Frequency Variation Characteristics under Load Side Response of Transformers	Guochao Qian
183	10:45~11:00	Coupled Electromagnetic-Thermal Analysis of A Dry-Type Power Transformer	Chengbing Zhang
141	11:00~11:15	Design and experimental validation of a repetitive pulse magnetic field system	Wen Wang
155	11:15~11:30	Research on the Substation Alarm Event Model Based on Natural Language Parsing Technology	Xiaomeng Li
199	11:30~11:45	An IPT-Based Voltage Equalizer with Voltage-Doublers for Battery-String Charging	Bohan Li
136	11:45~12:00	Small power litz wire ferrite inductor loss model based on neural network	Huizhong Sun

● **Session 10**

Moderator: Hongyang Lai

System ID	Time	Paper	Author
14	09:00~09:15	Temperature Prediction of Substation Distribution Cabinet Based on CNN-BiGRU Model with Attention Mechanism	Junchen Lu
34	09:15~09:30	Measurements of Electric Field in Atmospheric Pressure Argon Plasma Jet Under Different Active Gas Types and Concentrations by the E-FISH	Yukun Yang
42	09:30~09:45	Influence of discharge circuit parameters on the efficiency of reconnection electromagnetic launcher	Wenlong Jiang
53	09:45~10:00	A Frequency Domain Identification Method of General Mechanical Drive System	Ruizhe Zhou
58	10:00~10:15	Relative calibration and experimental results of ECEI near $q=1$ surface on J-TEXT	Qiang Luo
--	10:15~10:30	Coffee Break	
59	10:30~10:45	Measurement of plasma density profile for edge plasma on J-TEXT Tokamak	Ziyang Jin
60	10:45~11:00	Simulation on the suppression effect of external passive field on runaway electrons on J-TEXT	Keze Li
61	11:00~11:15	Impurity emissivity tomographic reconstruction by CCD imaging system on J-TEXT	Jiaming Wang
64	11:15~11:30	Degradation trajectories prognosis for fuel cell based on MP-NBEATS	Yuxuan Zheng
74	11:30~11:45	Fractional Order Dynamic Super-twisting Terminal Sliding Mode Tracking Control for Linear Motor	Xinyu Zhao
82	11:45~12:00	Digital filter implementation: An alternative to improve the estimation of the level of balls in mills used in the mining industry	Julio López

Poster Sessions

Session1: Renewable energy system

Session2: Power electronic technology and application

Session4: Power system and automation

Sat 9/12 9:00-12:00

● Session 1

System ID	Paper
30	A Comparative Analysis for Optimal Windfarm Cluster Identification Using Hopkins Index and Silhouette Coefficient
182	Small Signal Modeling of Sending-end Offshore Wind Power MMC-HVDC Integration Systems Considering Positive and Negative Sequence Separation Module
185	Modeling and Analysis of AC Distribution Grids with Wind and Solar Storage
98	A VSG-based Grid-Connected Photovoltaic Generation System with Hybrid Energy Storage
101	Challenges and Solutions in Integrating Large-Scale Photovoltaic Systems with Weak Electrical Grids
104	Variable time scale optimization of distribution network for distributed photovoltaic access
71	Multi-objective optimization of distribution network system with energy storage and distributed photovoltaic considering static voltage stability
105	Impact of distributed photovoltaic power generation on distribution network voltage
149	Design of Pulse Power Supply for Nonlinear Kicker of Synchrotron Radiation Light Source
153	A RNN-based Photovoltaic Power Identification Method for Distribution Networks
157	Optimization of BiLSTM for PV Output Prediction Based on Hybrid Bat Algorithm
148	A Study of Water Spillage of Small Hydropower Based on Copula Function
114	An innovative protection method for power collecting lines in wind farms
197	Reinforcement Learning-based Control Study of Three-phase LCL-type Photovoltaic Grid-connected Inverter

● **Session 2**

System ID	Paper
65	A Crosstalk Suppression Gate Driver for SiC MOSFET
107	A Smooth Recovery Strategy for Asymmetric Load Short-Circuit Fault of Three-Phase Three-Wire Inverters
111	Control Strategy of Modular Multilevel Matrix Converter under Unbalanced Input Voltages
56	Analysis on Pre-charging of Auxiliary Resonant Capacitor of Resonant DC Link Inverter
121	Design of a 105 GHz notch filter based on the frequency selective surfaces

● **Session 4**

System ID	Paper
19	Block Chain based P2P energy trading strategy in power retail market for MVPPs
68	Protection method of DC distribution network based on current mutation integral
106	Optimized operation strategy of source-load-storage multi-resource interaction in active distribution network
190	Reliability Evaluation of Distribution Network based on Time-series Production Simulation and Improved AFT-RSVM
93	Optimization strategy for multi-microgrid power sharing operation considering low-carbon characteristics
173	Analysis of Household Electric Vehicle Electricity Use Behavior Based on Non-intrusive Monitoring
7	Exploration and Practice of CO2 Emission Monitoring and Analysis Platform for Park Enterprises
99	Review of Modeling, Analysis and Suppression Strategies for Wide-band Oscillations in Microgrids
21	Considering the optimal input for global horizontal irradiance forecasting based on Informer

Session3: High voltage and insulation technology

Session5: Traction power supply technology and application

Session6: 5G and Wireless power transfer technology

Session7: Power system protection and control

Sat 9/12 14:00-17:30

● **Session 3**

System ID	Paper
5	Insulator Defect Detection based on Faster R-CNN and YOLOv3 Algorithm
9	Study on Partial Discharge of Scratch Defects in Cable Terminal by X-ray Excitation
36	A New Method for Defect localization of Cable Based on Pisarenko Harmonic Decomposition
57	Design of magnetic shielding structures for non-contact measurement of current in triangularly arranged cables
63	Study on Electric Field Distribution of Dampness Defect in Oil-paper Capacitive
70	The Design of Online Monitoring System for Resistive Leakage Current of Surge Arrester
124	Analysis of the Influence of Different Factors on the Lightning Withstanding Current
150	Research on The Electromagnetic Interference of Scanning Magnet Magnetic Field to Cable in Proton Therapy
151	Scan Path Optimization of Discrete Scanning Based on HE-GA in Proton Therapy
187	High-Resistance Fault Localization Method for Underground Cables Based on Three-Dimensional Wideband Impedance Spectra
194	The Research on the Effectiveness Evaluation Technology for the PD Sensing Components of the 220kV Cable Joint with Built-in Multi-Dimensional Sensing Elements
186	Lightning Breakdown Macroscopic Behavior Analysis of Three-element Mixed Insulation Oil-Paper System

● **Session 5**

System ID	Paper
175	Selection of Bidirectional DC-DC Topology for DC Microgrid Energy Storage Systems
209	Model predictive control of three-phase PWM rectifier
45	Optimal Traction Control for Heavy-haul Train Using Dynamic Response Identification Model
48	Deep Learning -Based Remaining Life Prediction for DC-Link Capacitor in High Speed Train
44	Short-term Metro Station Power Lighting Load Prediction Based on TimesNet

● **Session 6**

System ID	Paper
122	Space-Utilization Multi-Mode Quasi-Static Resonant Cavity Wireless Power Transfer for Fully Enclosed Arbitrary Regions
192	Broad-Scanning Linear Phased Array with Minimized Coupling for Wireless Energy Harvesting
204	The improved neural network algorithm is applied in the obstacle avoidance path planning of driverless vehicles
196	Low-Profile Phased Array Dielectric Resonator Antenna for 5G Internet of Thing Applications
193	MIMO Antenna Design with Dual-Polarization Characteristic for 5G Handheld Devices

● **Session 7**

System ID	Paper
113	Life expectancy Characteristics of Digital Relay Protection Devices
41	Asynchronous Motor Fault Diagnosis Output Based on VMD-XGBoost
43	Optimal torque distribution for energy consumption of pure
85	Review of Research on Mechanical Direct Current Circuit Breakers
142	Calculation of the transition resistance during Single-phase-to-ground Fault Based on Fault Recorder Data: Basic Theory, Error Analysis and Verification
176	A Method for Calculating the Growth Rate of Resistive Current and Fault Diagnosis of MOA Based on Synthetic Vector
162	A Digital Twin System for Comprehensive and Dynamic Temperature Rise Sensing of Current-Limiting Reactors
177	A Novel Transient Bus Protection Algorithm Based on HHT

Session8: AI-driven technology

Session9: Transformer technology and applications

Session10: Electric Machine Design and control

Sun 10/12 9:00-12:00

● **Session 8**

System ID	Paper
6	Feature identification method for abnormal operations in grid dispatch operations based on association analysis
117	Low Carbon Dispatch Strategy for Power System Based on Spatio-Temporal Distribution of Flexibility Resources
118	Construction of Carbon Emission Evaluation Indicator System Based on Regional Energy Information Data
159	Research on Real-Time Power Matching Problem in Stepping up from Zero Based on Self-Synchronous Voltage Source

● **Session 9**

System ID	Paper
184	Study on the Loss Characteristics of Dry-Type Power Transformers Considering Stray Losses
154	Frequency response characteristics of autotransformer split windings under typical faults
180	Research on Test Technology of Substation Connected to Centralized Monitoring System under New Energy Background

● **Session 10**

System ID	Paper
22	Design of Electrical Control System for Multi-station Modular Machine Tool
23	EMI in Sensorless PMSM Drive System Based on Disturbance Observer
33	Optimized Design of a Thermionic Electron Gun Applied to a High-power FEL Injector
91	Design of a dynamic ridge filter for shortening beam delivery time: a simulation study
125	Rotor Parameter Sensitivity Analysis and Electromagnetic Performance Optimization of PMASynRM
147	The wave coupling simulation result of ICRF antenna in J-TEXT relying on the perfectly matched layer technique
152	Design of Wireless Separately Excited DC Motor Speed Control System
201	Performance test of CuCrZr wire for high magnetic field pulsed magnet
167	Research on Multi-sensor Fusion Positioning and Navigation of Substation Inspection Robot Based on Beidou RTK and 3D Laser

Keynotes

A Soft Fault Location Method for Power Cable Based on Frequency Domain Reflection with AR Model



Professor. Kai Zhou
Sichuan University

Biography

Kai Zhou, He received the B.Sc. degree in electrical engineering in 1998, and the M.Sc. degree in 2003, from Chongqing University, Chongqing. He received the Ph.D. degree in 2009 from Xi'an Jiaotong University, Chengdu. From June to December, 2008, he was a visiting student in the Department of Electrical and Computer Engineering, University of Waterloo, Canada. From 2012 to 2013, he was a visiting professor in the Department of Electrical and Computer Engineering, Mississippi State University, USA. Currently, he is a professor and director of high voltage laboratory in College of Electrical Engineering, Sichuan University, China. His research interests are in failure mechanism for solid dielectric and diagnosis of cable system. Dr. Zhou is author and co-author of two books on high voltage and insulation, and over 100 papers published in IEEE transactions, in other journals and in proceedings of international and national conferences.

Abstract

Compared with the TDR (Time Domain Reflection) location method, FDR (Frequency Domain Reflection) is used to solve the soft faults (defects) location for high sweeping frequency and signal to noise ratio. The location spectrum of the existing FDR method requires artificial window smoothing and is affected by spurious peaks. Therefore, this paper proposes a cable defect location method based on auto-regression (AR) model. In this method, linear difference model is used to construct AR model of FDR signal instead of fast Fourier transform (FFT) to solve the problem that FFT does not satisfy the unbiased and consistent. Then the modified Yule-Walker equation and the total least squares were used to calculate the parameters of the AR model, and the power spectrum of the AR model was used to accurately locate the cable soft fault. Compared with the existing FDR method, this method does not need to add window function, and can weaken the influence of spurious peak on location spectrum. Finally, the feasibility and effectiveness of the proposed method are verified by the simulation and the experiment.

Advanced Bi-directional DC-DC Converters in Battery Energy Storage Systems

Associate Professor. Kai Sun
Tsinghua University

Biography

Kai Sun (M'12-SM'16) received the B.E., M.E., and Ph.D. degrees in electrical engineering from Tsinghua University, in 2000, 2002, and 2006, respectively. He joined the faculty of Electrical Engineering, Tsinghua University, in 2006, where he is currently a Tenured Associate Professor (Research Professor). From Sep 2009 to Aug 2010, he was a Visiting Scholar at Department of Energy Technology, Aalborg University, Aalborg, Denmark. From Jan to Aug 2017, he was a Visiting Professor at Department of Electrical and Computer Engineering, University of Alberta, Edmonton, Canada. His research interests include power electronics for renewable generation systems, microgrids, and energy internet.

Dr. Sun serves as an Associate Editor for IEEE Transactions on Power Electronics, IEEE Journal of Emerging and Selected Topics in Power Electronics, and Journal of Power Electronics. Dr. Sun served as the TPC Vice Chair of IEEE ECCE2017 and IEEE ECCE-Asia2017, the Organization Committee Chair of IEEE eGrid2019, and the Publicity Chair of IEEE ECCE2020. He also served as the General Co-Chair of 2018 International Future Energy Challenge (IFEC2018). Dr. Sun serves as PELS Asia Pacific Regional Vice Chair, PELS Beijing Chapter Chair and PELS Electronic Power Grid Systems Technical Committee (TC8) Secretary. He was a recipient of Delta Young Scholar Award in 2013, and Youth Award of China Power Supply Society (CPSS) in 2017, and IEEE Transactions on Power Electronics' Outstanding Reviewers Award in 2019.

Abstract

Battery energy storage systems (BESS) are the main infrastructures in the microgrids to ensure power balance and stable operation, as well as in the utility grid to enhance flexibility and stability. Bi-directional DC-DC converters are the key elements in BESS, which interface batteries and DC bus for power transfer. In this lecture, a comprehensive review for isolated bi-directional DC-DC converters is presented. The requirements of BESS on isolated bidirectional DC-DC converters with high efficiency and high power density are introduced. Two major solutions of isolated bidirectional DC-DC converters, CLLC resonance converter and dual-active-bridge (DAB) converter, are investigated and compared, including modeling methods, control strategies and design considerations with the use of SiC and GaN devices. This lecture points out that both CLLC and DAB converters have their own advantages and good application prospects in future large-scale energy storage systems. Moreover, a modular multi-port CLLC converter based on high frequency AC bus sharing is proposed to integrate multiple battery stacks, which features high efficiency, high reliability and good scalability.

Artificial Intelligence and its Application in Renewable Energy Systems**Professor. Weihao HU**

University of Electronic Science and Technology of China

Biography

Weihao Hu (IET Fellow, IEEE Senior Member) received the B.Eng. and M.Sc. degrees from Xi'an Jiaotong University, Xi'an, China, in 2004 and 2007, respectively, and the Ph.D. degree from Aalborg University, Denmark, in 2012, all in electrical engineering.

He is currently a Full Professor and the Director of Institute of Smart Power and Energy Systems, University of Electronics Science and Technology of China, Chengdu, China. He was an Associate Professor with the Department of Energy Technology, Aalborg University, Denmark, and the Vice Program Leader of Wind Power System Research Program at the same department. He has led/participated in more than 15 national and international research projects and he has more than 170 publications in his technical field. His research interests include artificial intelligence in modern power systems and renewable power generation. Dr. Hu is an Associate Editor for the IET Renewable Power Generation, a Guest Editor-in-Chief for the Journal of Modern Power Systems and Clean Energy Special Issue on Applications of Artificial Intelligence in Modern Power Systems, a Guest Editor-in-Chief for the Transactions of China Electrical Technology Special Issue on Planning and operation of multiple renewable energy complementary power generation systems, and a Guest Editor for IEEE TRANSACTIONS ON POWER SYSTEMS Special Section on Enabling very high penetration renewable energy integration into future power systems. He was the Technical Program Chair for IEEE INNOVATIVE SMART GRID TECHNOLOGIES Asia 2019 and is the Conference Chair for the Asia Energy and Electrical Engineering Symposium. He is currently the Chair for IEEE Chengdu Section PELS Chapter. He is a Fellow of the Institution of Engineering and Technology, London, U.K.

Abstract

Recent years, renewable energy is experiencing a rapid growth, large number of renewable energy sources have been installed and connected to power systems. In addition to the large centralized wind farms connected to transmission grids, many distributed wind turbines and PV panels are operated as distributed generators in distribution systems. This presentation discusses several applications of artificial intelligence in renewable energy systems, including the European and Chinese experiences. Some of our research at Institute of Smart Power and Energy Systems (ISPES), University of Electronics Science and Technology of China (UESTC) will also be introduced.

Modeling and Control of Power Electronic Converters for Microgrid Applications



Professor. Yang Han

University of Electronic Science and Technology of China

Biography

Yang Han (S'08-M'10-SM'17) received the Ph.D. degree in Electrical Engineering from Shanghai Jiaotong University (SJTU), Shanghai, China, in 2010. In 2010, he joined the University of Electronic Science and Technology of China (UESTC), Chengdu, China, where he has been an Associate Professor in 2013, and Full professor in 2021. From March 2014 to March 2015, he was a Visiting Scholar with the Department of Energy Technology, Aalborg University, Aalborg, Denmark. He is currently with the School of Mechanical and Electrical Engineering, UESTC. His research interests include the ac/dc microgrids, active distribution networks, power quality, grid-connected converters for renewable energy systems, active power filters, multilevel converters, and static synchronous compensators (STATCOMs).

Dr. Han has received several national and provincial projects, and more than 30 industrial projects in the area of power electronics, smart grid, microgrid, and power quality analysis and compensation. He holds more than 40 issued and pending patents. Dr. Han was listed as "World Top 2% Scientist 2020" by Stanford University in 2020 and 2022, and the recipient of the Young Scientist Award in CPESE 2021, the Provincial Science and Technology Award in 2020, Science and Technology Award from Sichuan Electric Power Company in 2019, Academic Talent Award by UESTC, in 2017, Baekhyun Award by the Korean Institute of Power Electronics, in 2016. He has published a book "Modeling and Control of Power Electronic Converters for Microgrid Applications", ISBN: 978-3-030-74512-7, Springer. He served as an Associate Editor of Journal of Power Electronics and IEEE ACCESS (2019-2020).

Abstract

This presentation introduces the fundamental ideas of power electronic converter modeling and control, digital simulation, and experimental studies in the renewable energy systems and AC/DC microgrid. Recent advanced control methods for voltage source inverters (VSIs) and the hierarchical controlled islanded microgrid would be presented, including the mathematical modeling, controller synthesis, parameter selection and multi-time scale stability analysis, as well as the consensus-based control strategies for the microgrid and microgrid clusters. This topic would be an invaluable technical reference for practicing engineers and researchers working in the areas of renewable energy, power electronics, energy internet, and smart grid. This topic has been published in the recent book "*Modeling and Control of Power Electronic Converters for Microgrid Applications*"

by Springer: <https://www.springer.com/gp/book/9783030745127>.

Special Sessions

Current Collection Performance of High-speed Rail Pantograph-catenary System for 400 km/h and above



Professor. Yang Song
SWJTU-Leeds Joint School, Southwest Jiaotong University

Biography

Yang Song, IEEE Senior Member, Professor at SWJTU-LEEDS Joint School, Southwest Jiaotong University, China. He worked as a Research Fellow, Postdoctoral Fellow, and Researcher at University of Huddersfield (UK), Norwegian University of Science and Technology, and Oslo Metropolitan University from 2018 to 2023. He serves as an Associate Editor for the prestigious SCI journal IEEE Trans. Instrum. Meas. (IF: 5.332, JCR Q1) and IEEE Trans. Veh. Technol. (IF: 6.8, JCR Q1). His research interest includes the assessment of current collection quality of high-speed trains, the coupling dynamics in high-speed rail systems, and the application of artificial intelligence in high-speed rail computational mechanics.

He has published over 30 academic papers as the first or corresponding author in prestigious SCI journals such as IEEE/ASME Trans., Mech. Syst. Signal Process.. Four have been selected as highly cited papers in top ESI 1%. He has been included in the yearly World 2% Top Scientist in 2023.

Abstract

The next generation of high-speed railways aiming for even higher speeds is currently being developed, characterized by the improvement of speed to over 400 km/h. In this presentation, the applicability of current assessment quantities to speeds of 400 km/h and above is preliminarily investigated with a numerical model. The potential of optimizing parameters for improving interaction performance is also explored at this speed level. The presentation further reviews and preliminarily analyses the effects of common disturbances, such as geometric deviation and aerodynamics, on the pantograph-catenary interaction performance at 400 km/h and above. Overall, this presentation offers insights into the current state of research on pantograph-catenary interaction for high-speed railways and proposes future directions for improving the system to ensure optimal performance at speeds of 400 km/h and above.

Distributed optimization control method of voltage in intelligent distribution network with high proportion photovoltaic driven by grid-connected inverters under time-delay



Associate professor. Leijiao Ge

School of Electrical and Information Engineering, Tianjin University

Biography

Leijiao Ge is currently an associate professor at the School of Electrical Automation and Information Engineering, Tianjin University. Long-term engaged in smart distribution network situation awareness, new energy grid-connected optimization control and artificial intelligence enabled distribution network/micro-grid work. The main academic and technological achievements and contributions include:

- 1) Constructing the theory of intelligent distribution network situation awareness;
- 2) Propose an intelligent distribution network situation understanding model;
- 3) Develop intelligent distribution network situation prediction technology.

In the past five years, as the project leader, he presided over 54 vertical and horizontal projects, such as the science and Technology Innovation 2030 major project, the Young Scientist Project, the National Natural Science Foundation of China Youth, the sub-tasks of the National Key Research and development program projects, the National Development and Reform Commission, the national defense and military industry, and the Tianjin natural science multi-key fund, as a core backbone in national key research and development plans the National 863 projects, China-UK International Cooperation Project of the National Natural Science Foundation of China and other 6 projects; has been awarded 24 provincial and ministerial awards, one of them won the first prize of the Energy Innovation Award of the China Energy Research Association and the second prize of the scientific and Technological Progress Award of Tianjin, many of these achievements have been deployed in various demonstration zones in Tianjin and have achieved remarkable benefits; more than 150 papers have been published, among them, there are 55 SCI first/communication authors (20.1% hot papers and 1 ESI high cited paper) , including IEEE Transactions on Sustainable Energy, IEEE Transactions on Smart Grid, IEEE Transactions on Power Systems, and IEEE Transactions on Instrumentation and Measurement, he has written 5 Chinese and English monographs (chapters) , participated in writing 6 international and domestic industry standards and norms, and authorized 39 invention patents.

Abstract

The high proportion and strong randomness of photovoltaic dispersed and disorderly access to intelligent distribution network often lead to node voltage exceeding limits, and the inevitable communication delay between multiple control objects during the voltage regulation process exacerbates the difficulty of voltage optimization control in intelligent distribution network. Therefore, this paper proposes a distributed optimization control method of voltage in intelligent distribution network with high proportion photovoltaic driven by grid-connected inverters under time-delay. Firstly, the volt-var regulation capability of PV inverters is analyzed. With the goal of minimizing node voltage deviation, introduce consistency factors and construct a distributed optimization control model without delay for volt-var regulation in distribution network with high proportion photovoltaic based on distributed consistency algorithm to identify the direction to solve the voltage overrun problem in distribution network with high proportion photovoltaic. Then, considering the influence of communication delay, establish a consistency protocol that couples the algorithm with communication delay, obtain a distributed optimization control model with delay for volt-var regulation in a distribution network with high proportion photovoltaic based on distributed consistency algorithm, and use the integral quadratic method to reduce the conservatism of the system delay stability criterion. By solving the stability margin of the time delay model through linear matrix inequalities, the maximum time delay of voltage optimization control of intelligent distribution network with high-proportion photovoltaic is obtained, which provides numerical reference for distributed voltage regulation of distribution network with high proportion photovoltaic. Finally, the improved IEEE33-node system is used for example verification. The results show that the proposed method can reduce the voltage deviation and voltage regulation cost by 11.2% and 12.5%, respectively, which proves the superiority of the proposed method.

Stability Analysis of the Grid-Forming Converter in Current Limiting Mode



Dr. Yonghui Liu
Xi'an Jiaotong University

Biography

Yonghui Liu, assistant professor at Xi'an Jiaotong University. She received the B.S. degree in electrical engineering from the Harbin Institute of Technology, the M.S. degree in electrical engineering from Xi'an Jiaotong University, and the dual Ph.D degree in electrical engineering of Xi'an Jiaotong University and the Hong Kong Polytechnic University. Her research interests include modeling and control of converters, renewable energy integration, and VSC-HVDC.

She has published 21 SCI/EI journal papers, including 2 ESI papers. Her citation index is 489, and h-index is 12. She has authorized 15 Chinese patents and 2 American patents. She received the "Best Student Paper Award" in proc. IEEE I&CPS Asia, 2021, "Best Conference Paper Award" in proc. IEEE CEEPE, 2021, and "IEEE PELS Best ECCE Paper on Emerging Technology Award" in proc. ECCE, 2019. She works as reviewers of several SCI journals such as IEEE Transactions on Power Electronics, CSEE Journal of Power and Energy System, International Journal of Electrical Power & Energy Systems, etc. She is currently working as the guest editor of the SCI Journal of Frontiers in Energy Research.

Abstract

With the increased renewable energy penetration, grid-forming (GFM) converters have shown extensive application prospects in new power systems. The GFM converter serves as a controllable voltage source in normal mode. Therefore, the output current of a GFM converter is determined by the outside grids and loads. When the voltage of the outside grid drops or the loads increase, the output current of a GFM converter will grow naturally.

However, the converter has a weak ability to withstand overcurrent. Current limiting control for a GFM converter is necessary in actual application to prevent the converter from being damaged by overcurrent. The output current amplitude is controlled as a constant, while the output voltage is determined by the outside grids and loads in the current limiting mode. As a result, the stability of a GFM converter in the current limiting mode will be different from that in normal voltage control mode.

This speech will first discuss some cases where GFM converters may enter the current limiting mode. Then, the state-of-the-art of stability analysis of the current limiting mode will be introduced. Furthermore, some new findings of the speaker in this aspect will be presented. Eventually, future challenges will be discussed.

**Intelligent Enhancement Technology for Wideband Oscillation Disturbance Source
Localization in Power Systems**

Research Associate Professor. Zongsheng Zheng
Sichuan University

Biography

Zongsheng Zheng (M'20) received the Ph.D. degree in electrical engineering from Southwest Jiaotong University, Chengdu, China, in 2020. During 2018- 2019, he was a Visiting Scholar at the Bradley Department of Electrical and Computer Engineering at Virginia Tech-Northern Virginia Center, Falls Church, VA, USA. He is currently a Research Associate Professor at the College of Electrical Engineering, Sichuan University. His research interests include uncertainty quantification, parameter and state estimation.

Abstract

Regarding the issue of weak accuracy and generalization ability in existing research on wideband oscillation, which often uses simulated data or fewer real measurement samples to train correlation models, a data enhancement method based on collaborative use of Conditional Generative Adversarial Network (CGAN) and Generative Adversarial Interpolation Networks (GAINs) is proposed. This method can generate realistic and clear data, where the CGAN network can achieve directional data generation tasks, effectively increasing the number of wideband oscillation samples, and enhancing the potential feature information content of sample set.

Research on the mechanism of shielding metamaterials in wireless power transfer system



Lecturer. Cancan Rong
China University of Mining and Technology

Biography

Cancan Rong (Member, IEEE) was born in China, in 1991. He received the Ph.D. degree in electrical engineering from the School of Electrical and Electronic Engineering, Huazhong University of Science and Technology, Wuhan, China, in 2021. He is currently a Lecturer with the China University of Mining and Technology, Xuzhou, China. His research interests include wireless power transfer system and metamaterials.

Abstract

Wireless power transfer (WPT) technology has attracted a great deal of attention due to its convenience, universality, and novelty. However, the electromagnetic leakage is inevitably generated in WPT systems and poses a serious danger to human health, especially human brain tissue. Fortunately, electromagnetic metamaterials with mu-near-zero (MNZ-MM) have been presented to explain the shielding effect in the WPT systems. Compared with the ferrite and Al plate, the MNZ-MM was found to have the best shielding effect by measurements and could achieve a maximum reduction of 17.52dB at 13.56MHz. In conclusion, this kind of MNZ-MM is proven to have a good prospect to solve the EMF leakage issue in the future.

Research on efficiency improvement technology for IPT systems using
reconfigurable circuits



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Biography

Yefei Xu (Member, IEEE) received the B.Sc. and M.Sc. degrees in electrical engineering from the School of Electrical Engineering, Shenyang University of Technology, Shenyang, China, in 2014 and 2017, respectively, and received the Ph.D. degree in electrical engineering from the School of Electrical Engineering, Southwest Jiaotong University, Chengdu, China, in 2022. He is currently an Associate Researcher with the School of Electrical Engineering, Sichuan University, Chengdu, China. His research interests include wireless power transfer and power cable defect location.

Abstract

With the merits of flexibility and safety, inductive power transfer (IPT) technology has been widely employed in industry and consumer electronics. For most applications, transmission efficiency is one of the most crucial performances. Thus, reconfigurable circuits are proposed to elevate the transmission efficiency of IPT systems. Compared with traditional methods, the advantages of the reconfigurable circuits are easy to control, high universality, and strong robustness. Consequently, reconfigurable circuits can provide an extra available way to improve IPT efficiency in some applications with extreme conditions.

A Fault Diagnosis Method for Cascaded H-Bridge Multilevel Converters

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Biography

Hongjian Lin (Senior Member, IEEE) received a Ph.D. in electrical engineering, Southwest Jiaotong University, Chengdu, China, in 2021. From August 2018 to September 2018, he was a visiting Ph. D. student in Nanyang Technological University. From 2019 to 2020, he was a joint-cultivated Ph. D. with the School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA, USA. From 2021 to 2022, He was a Research Associate with the Department of Electrical Engineering, Hong Kong Polytechnic University, Hong Kong, China. He is currently a Research Fellow with Center for Smart Energy Conversion and Utilization Research, City University of Hong Kong, Hong Kong.

His research interests include nonlinear control of DC-DC converters in microgrids, electromagnetic materials property analysis, wireless power transfer technique, artificial intelligence control, electrical machines and drives control, electric traction supply system, and modulation, control, Fault diagnosis, and Fault tolerant technologies of multilevel converters in the solid-state transformer. He is a guest associate editor for IEEE Transactions on Power Electronics, Chinese Journal of Electrical Engineering, and Frontiers in Electronics.

Abstract

A cascaded H-bridge multilevel converter (CHBMC), which is composed of power cells is an attractive AC-DC converter for medium- and high-voltage applications in terms of its modularity, improved harmonic performance, and higher rated voltage withstand capability. Nevertheless, the overall operation and stability of the CHBMC can be affected by inevitable issues such as the open-circuit (OC) switch fault. This issue causes adverse effects. Hence, it is vital to develop an effective but straightforward method to identify the OC switches. This paper proposes an OC switch fault diagnostic method which is based on counters. These counters are defined to have a one-to-one correspondence with the CHBMC switches. First, a fault feature variable is obtained based on a current residual generated from the estimated current model and the OC switch fault output voltage conditions. Subsequently, based on a post-fault logic judgment process, the output voltage levels, the driving signal combinations, and the current polarity, the counters indicate the OC switch fault and its position. The proposed method is simple and voltage level-independent, making it ideal for diagnosing multiple OC switch faults for the CHBMC in a power cell and different cells.

Research on Optimized Modulation Strategy of Dual Active Bridge DC-DC Converter



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Biography

Yuanhong Tang received the B.S. from Jishou University, Hunan, China, in 2016, the M.S. and Ph.D. degree from the University of Electronic Science and Technology of China (UESTC), Chengdu, China, in 2019 and 2022, respectively. He is currently a senior engineer at MORNSUN Guangzhou Science & Technology Co., Ltd., Guangzhou, China. His current research interests include switching-mode power supplies, soft switching techniques, and renewable energy sources.

Abstract

In order to realize the collection, transformation and transmission of the renewable energy resources, the Dual-Active-Bridge (DAB) DC-DC converter has become a key energy conversion device. Due to many nonlinear parameters are contained in the DAB DC-DC converter, it is difficult to be modeled accurately by using the traditional mathematical modeling methods. Moreover, this converter contains many switching devices and its operating conditions are very complex in practical application, which leads to the defects of heavy calculation burden, high complexity, and difficulty in optimization when solving the optimization modulation strategy.

Faced with such a high-dimensional optimization solution system with complex and changing modeling, artificial intelligence (AI) technology has shown its advantages in many system optimization decisions with large data volume, complex modeling and uncertainty, and is suitable for fast optimization solving problems of high-dimensional complex systems. Based on this, dissertation applies AI technology to the comprehensive optimization of the modulation strategy of the DAB DC-DC converter, focusing on the following three aspects of research work.

- (1) Optimization modulation strategy based on the linear piecewise time-domain model;
- (2) Optimization modulation strategy based on the unified harmonic analysis model;
- (3) Online efficiency optimization self-learning modulation strategy without prior knowledge about the circuit model.

