

Special Session VI

Special Session Basic Information:

专栏题目 Session Title	中文：基于人工智能技术的主动配电网智慧管理 英文：Artificial Intelligence-Assisted Management of Active Distribution Networks
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专栏介绍和征稿主题

Introduction and topics

近年来，为构建低碳能源环境，配电网中的分布式能源（如分布式发电机、屋顶光伏、储能系统、电动汽车等）取得了快速发展。在此背景下，配电网（又称主动配电网）的角色已不再局限于终端用户，而是演变为整合众多分布式能源的物理平台。然而，分布式能源的接入也给配电网带来了诸多管理挑战，例如可再生分布式能源日益增长的不确定性，以及海量分布式能源设备难以驾驭的控制复杂性。所幸，人工智能技术凭借其模式挖掘、智能推理等强大特性，为解决这些挑战提供了潜力。本专题会议旨在征集围绕人工智能赋能的主动配电网管理的高质量研究论文，议题包括但不限于：

- 议题一：主动配电网运行与规划的管理优化技术
- 议题二：面向主动配电网的大数据分析与数据挖掘技术
- 议题三：先进人工智能技术在主动配电网中的应用
- 议题四：物理知识与机器学习的融合应用
- 议题五：协同管理中的隐私保护技术
- 议题六：基于人工智能的配电网动态建模与控制

In recent years, distributed energy resources (DERs) (e.g., distributed generators, rooftop solar power, energy storages, electric vehicles) in distribution networks have developed rapidly toward the goal of constructing a low-carbon energy environment. Within such a context, the role of distribution networks, a.k.a. active distribution networks (ADNs), has not been limited as end-users but has come down to a physical platform that integrates numerous DERs. However, various management challenges in distribution networks have arisen due to DER integration, such as increasing uncertainties of renewable DERs and intracible control complexity of tremendous DERs. Fortunately, artificial intelligence (AI) techniques offer potential to address these challenges by their various powerful characteristics (e.g., pattern mining, intelligent Inference). This special session aims to gather high-quality research papers around AI-assisted management of ADNs. Topics of interest include, but are not limited to:

- Topic 1. Management optimization techniques on operations and planning in ADNs.
- Topic 2. Big data analytics and data mining techniques for ADNs.
- Topic 3. Advanced AI techniques in ADN applications.
- Topic 4. Synergy of physical knowledge and data in machine learning.
- Topic 5. Privacy-preserved techniques for coordinated management.
- Topic 6. AI-Enabled Dynamical Modeling and Control of ADNs.

Special Session Chair(s):

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Organizer's Brief Biography

中文：林伟博士现为重庆大学副教授。他于 2016 年及 2021 年先后在重庆大学获得学士及博士学位，2019 年至 2020 年期间曾赴康涅狄格大学担任访问学者，2021 年至 2024 年期间曾在香港从事博士后研究工作。主要研究方向包括可信人工智能技术及其在电力系统中的应用、电力系统运筹学以及能源政策分析。以第一/通讯作者发表 SCI 论文 20 篇、一著出版 Springer 专著 1 部、参与编写国内外行业技术报告 2 本；担任 SCI 期刊 IET Renewable Power Generation 的副编辑；获得重庆市科学技术进步奖一等奖等荣誉。主要研究方向包括可信人工智能技术及其在电力系统应用、电力系统运筹优化以及能源政策分析。

英文：Dr. Wei Lin is currently an Associate Professor at Chongqing University, where he got his B.E., and Ph.D. degrees from Chongqing University, China, in 2016, and 2021, respectively. He was a visiting research scholar at the University of Connecticut, from 2019 to 2020. He was a postdoctoral fellow at several top universities at Hong Kong from 2021-2024. He has published 20 SCI-indexed journals (first/corresponding author) and one Springer monograph (first author) and co-authored two technical reports for domestic and international industry. He served as an Associate Editor of IET Renewable Power Generation. He is an owner of the Chongqing Municipal Science and Technology Progress Award (first-class prize) and Power Science and Technology Progress Award (third-class prize) of the Chinese Society for Electrical Engineering. His research interests include trustworthy AI techniques and their power system applications, operations research in power systems and energy policy analysis.



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Organizer's Brief Biography

中文：余益博士于 2022 年获得武汉大学控制科学与工程博士学位，随后在南方科技大学和香港理工大学进行了博士后研究。迄今为止，他已在顶级国际期刊和会议上发表了 30 余篇经同行评审的论文，包括 1 篇以第一作者身份发表在 *Nature Communications* 上的论文，以及 17 篇以第一作者或通讯作者身份发表在 *IEEE Transactions* 系列期刊上的论文（其中 4 篇为高被引论文）。他的学术贡献获得了多项殊荣，包括 2024 年 *IEEE/CAA Journal of Automatica Sinica* 国际会议最佳论文奖、中国自动化学会优秀博士学位论文奖，以及南方科技大学校长卓越博士后奖。此外，他积极服务学术界，目前担任国际期刊 *Energies* 的客座编辑和 FASTA 学会青年委员会副主任。他还曾担任 3 个国际会议的专题主席，包括第十届电力电子系统及应用国际会议（PESA 2024）。

英文：Dr. Yi Yu received his Ph.D. in Control Science and Engineering from Wuhan University in 2022 and subsequently conducted postdoctoral research at Southern University of Science and Technology (SUSTech) and The Hong Kong Polytechnic University. To date, he has published more than 30 peer-reviewed papers in top-tier international journals and conferences. This record includes one first-authored paper in *Nature Communications*, and 17 first- or corresponding-authored papers in prestigious *IEEE Transactions* journals (four of which are recognized as Highly Cited Papers). His scholarly contributions have been recognized with several awards, including the 2024 Best Paper Award at the International Conference of *IEEE/CAA Journal of Automatica Sinica*, the Excellent Doctoral Dissertation Award from the Chinese Association of Automation, and the President's Distinguished Postdoctoral Fellowship at SUSTech. Furthermore, he is actively engaged in the academic community, serving as a Guest Editor for the international journal of *Energies* and as the Deputy Director of the Youth Committee of the FASTA Society. He has also served as a session chair for three international conferences, including the 10th International Conference on Power Electronics Systems and Applications (PESA 2024).

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Organizer's Brief Biography

中文：梁子鹏分别于华南理工大学获得电气工程学士和硕士学位，并于香港理工大学电子及电气工程学系取得博士学位。目前，他任职于香港理工大学电子及电气工程学系。其主要研究方向包括智能电表数据分析、含可再生能源的微电网运行与规划等。他深度参与国家重点研发计划项目（高比例可再生能源并网的电力系统运行与规划基础理论）、国家自然科学基金重点项目、香港中华电力公司等项目 6 项，以第一作者或通讯作者身份在 IEEE Trans 等 SCI 一区期刊发表论文 10 余篇。他长期担任 20 余个 SCI 期刊的审稿人，包括 IEEE Trans. on Smart Grid/Power Systems/Sustainable Energy/Industrial Informatics/Power Delivery/ Information Forensics & Security/ Network Science and Engineering/Reliability/Big Data/ Energy Markets, Policy, and Regulation/Industry Applications、Advanced Science、Applied Energy、IEEE Internet of Things Journal、Energy 等。现任 Protection and Control of Modern Power Systems、IET Energy Conversion and Economics 期刊的青年编委。他曾获香港理工大学校长博士生奖学金（Presidential PhD Fellowship）、IEEE PES APPEEC 最佳论文奖、“领跑者 5000-中国精品科技期刊顶尖学术论文”奖、《电网技术》优秀论文奖等荣誉，并入选 IEEE Trans. on Power Systems 杰出审稿人及中文核心期刊《电测与仪表》优秀审稿人。

英文：Zipeng Liang received the B.Eng. and M.Eng. degrees in Electrical Engineering from South China University of Technology, and the Ph.D. degree from the Department of Electrical and Electronic Engineering, The Hong Kong Polytechnic University, where he is currently with the same department. His research interests include smart meter data analytics and operation and planning of renewable-integrated microgrids. has been deeply involved in six major research projects, including the National Key R&D Program of China, the Natural Science Foundation of China (Key Program), and projects supported by CLP Power Hong Kong. He has published more than 10 papers as the first or corresponding author in top-tier SCI journals, including several IEEE Trans journals. He serves as a reviewer for over 20 SCI journals, such as IEEE Trans. on Smart Grid/Power Systems/Sustainable Energy/Industrial Informatics/Power Delivery/ Information Forensics & Security/ Network Science and Engineering/Reliability/Big Data/ Energy Markets, Policy, and Regulation/Industry Applications, Advanced Science, Applied Energy, IEEE Internet of Things Journal, and Energy, among others. He currently serves as a Young Associate Editor for Protection and Control of Modern Power Systems and IET Energy Conversion and Economics. He has received several honors, including the Presidential PhD Fellowship from The Hong Kong Polytechnic University, the IEEE PES APPEEC Best Paper Award, the “Top Academic Paper Award” of Leading 5000–China High-Quality Scientific Journals, and the Excellent Paper Award from Power System Technology. He has also been recognized as an Outstanding Reviewer for IEEE Transactions on Power Systems and for the Chinese core journal Electrical Measurement & Instrumentation.

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Organizer's Brief Biography

中文：尹鑫于 2018 年在中南大学取得电气工程及其自动化学士学位，并于 2024 年在华南理工大学电气工程专业取得博士学位。目前，他就职于华南理工大学电力学院，担任博士后岗位。其主要研究方向包括新型电力系统规划与运行、新能源高渗透微电网运行与规划等。他深度参与国家重点研发计划项目（高比例可再生能源并网的电力系统运行与规划基础理论、支撑 20% 新能源电量占比场景下的电网智能调度关键技术）、国家自然科学基金集成项目（新型电力系统背景下的大电网异步分区规划与控制研究）等国家级项目 3 项，以第一作者或通讯作者身份在 *IEEE Trans. on Sustainable Energy*, *IEEE Trans. on Industrial Informatics*, *Applied Energy* 等期刊发表论文 8 篇。他曾获华南理工大学博士生国家奖学金。

英文：Xin Yin received the B.Eng. degree in Electrical Engineering and Automation from Central South University, China, in 2018, and the Ph.D. degree in Electrical Engineering from South China University of Technology, China, in 2024. He is currently a Postdoctoral Researcher with the School of Electric Power Engineering, South China University of Technology. His research interests include planning and operation of new-type power systems, as well as operation and planning of renewable-rich microgrids. He has been deeply involved in several national research projects, including the National Key R&D Program of China (Fundamental Theories of Power System Operation and Planning for High Renewable Energy Integration; Key Technologies for Intelligent Dispatching of Power Grids Supporting 20% Renewable Energy Scenarios) and the Integrated Project of National Natural Science Foundation of China (Planning and Control of Asynchronous Partitioned Large-Scale Power Grids under the New Power System Paradigm). He has published eight papers as the first or corresponding author in prestigious journals such as *IEEE Transactions on Sustainable Energy*, *IEEE Transactions on Industrial Informatics*, and *Applied Energy*. He was the recipient of the National Scholarship for Doctoral Students from South China University of Technology.