Special Session II

Special Session Basic Information:

专栏题目 Session Title	中文：数据驱动的复杂系统可靠性评估与优化 英文：Data-Driven Reliability Assessment and Optimization of Complex Systems

专栏介绍和征稿主题
Introduction and topics

中文：随着传感器技术和工业互联网的飞速发展，智能制造、自动驾驶、航空航天等现代复杂系统产生了海量运行与监测数据 。传统的基于物理失效模型的可靠性评估方法在处理高维、非线性及动态演化系统时面临严峻挑战。本专题旨在汇集数据驱动技术在可靠性工程领域的最新理论与应用研究，重点关注如何利用机器学习、深度学习及统计学习方法，从多源异构数据中提取失效模式、预测剩余寿命并优化维护决策。

1) 基于深度学习的复杂系统故障诊断与性能退化建模
2) 多源异构监测数据驱动的剩余寿命预测方法
3) 基于强化学习的复杂系统预测性维护策略优化

英文：With the rapid development of sensor technologies, and Industrial Internet, modern complex systems, such as smart manufacturing, autonomous driving, and aerospace, generate massive amounts of operational and monitoring data. Traditional reliability assessment methods based on physical failure models face significant challenges when dealing with high-dimensional, non-linear, and dynamically evolving systems. This special session aims to gather the latest theoretical and applied research on data-driven techniques in reliability engineering. It focuses on leveraging machine learning, deep learning, and statistical learning methods to extract failure patterns from multi-source heterogeneous data, predict remaining useful life, and optimize maintenance decisions.

1) Deep learning-based fault diagnosis and degradation modeling for complex systems
2) Remaining Useful Life prediction methods driven by multi-source heterogeneous monitoring data
3) Optimization of predictive maintenance strategies for complex systems based on reinforcement learning

Special Session Chair(s):

姓名 Name	夏侯唐凡/Tangfan Xiahou
称谓 Prefix	副教授/Assoc. Prof.
部门 Department	机械与电气工程学院/Mechanical and Electrical Engineering
单位 Organization	电子科技大学/University of Electronic Science and Technology of China
城市/地区 City/Region	成都/Chengdu

Organizer's Brief Biography

中文：夏侯唐凡，博士，副教授，从事核能装备服役可靠性评估与剩余寿命预测方向的科学研究。主持国自科基金面上/青年项目、国家重点研发计划中法杰青项目、国防科工局技术基础项目子课题、四川省重大专项课题、中国博士后基金特别资助/面上项目等课题，参与国家自然科学基金重点项目、国防基础核科学挑战专题、华龙一号核电站数字化运维工程项目等。共发表期刊论文 40 余篇，其中，以第一/通讯作者在 IISE Transactions、IEEE Transactions on Reliability、Reliability Engineering and System Safety 等可靠性领域权威期刊发表论文 20 余篇，论文他引 1200 余次，受理/授权中国发明专利 10 余件，获软件著作权 8 项，牵头核电团体标准 1 项，参与国标/团标 4 项。获国防科学技术进步奖二等奖(排 4/10)，中国运筹学会运筹应用奖提名(排 2/10)，第十届中国科协青托、管理科学与工程一级学会优秀博士论文支撑计划、国际可靠性领域学生最高荣誉 IEEE Reliability Achievement 学生成就奖，IISE Annual2022(美国)、APARM2018& QR2MSE2018、中国运筹学会可靠性分会 2019 年学术年会等国内外会议最佳论文奖等 7 项。目前担任可靠性领域国际权威期刊 Reliability Engineering and System Safety 客座主编、可靠性领域知名期刊 International Journal of Reliability and Safety 编委和《工业工程》期刊编委，担任 IEEE 可靠性国际学会成都分区秘书长(2023-2025)、四川省机械工程学会智能运维分会副秘书长、四川省系统工程学会理事。

英文：I'm currently an Associate Professor with the School of Mechanical and Electrical Engineering, University of Electronic Science and Technology of China. I have received my Ph.D. degree in mechanical engineering from UESTC in 2022. I have been doing research on reliability engineering and prognostics and health management (PHM) for nuclear power plants more than ten years. I have published more than 40 peer-reviewed papers in international journals. I have received several international awards, including the Second prize of National Defense Science and Technology Progress Award, Operation Research Application Nomination Award, China Association for Science and Technology Young Talents Promotion Project, IEEE reliability society Student Achievement Award, IISE annual conference 2022 QCRE Best Track Paper Award Finalist, and Best Paper Award in APARM2018&QR2MSE2018. I currently serving as the associate editor of International Journal of Approximate Reasoning, the guest editor of the Reliability Engineering and System Safety and the Editorial Board of International Journal of Reliability and Safety and Journal of Reliability Science and Engineering. I am also a member of IEEE, IEEE reliability, IISE societies.

姓名 Name	李乘龙/Chenglong Li
称谓 Prefix	副教授/Assoc. Prof.
部门 Department	管理学院/School of Management
单位 Organization	西北工业大学/Northwestern Polytechnical University
城市/地区 City/Region	西安/Xi'an

Organizer's Brief Biography

中文：李乘龙，西北工业大学管理学院副教授、博士生导师。主要从事工业生产与服务运营过程的质量控制与管理优化问题研究，聚焦相关复杂数据流的统计建模、分析、监测与诊断。主持国家自然科学基金项目、教育部人文社科项目等。研究成果发表在 IISE Transactions、Technometrics、International Journal of Production Research 等权威学术期刊上。曾获评管理科学与工程学会优秀博士学位论文、陕西省科学技术进步奖等科研奖励。

英文：Dr. Chenglong Li is an associate professor in the School of Management at Northwestern Polytechnical University. His research focuses on quality control and management optimization in industrial production and service operations, with particular emphasis on related statistical modeling, analysis, monitoring, and diagnosis of complex data streams. He has led multiple research projects funded by the National Natural Science Foundation of China and the Ministry of Education's Humanities and Social Sciences Project. His research outcomes have appeared in IISE Transactions, Technometrics, and International Journal of Production Research, among others. He has been honored with awards including the Excellent Doctoral Dissertation Award from the Society of Management Science and Engineering of China, and the Shaanxi Provincial Science and Technology Progress Award.

姓名 Name	吴蓓/Bei Wu
称谓 Prefix	副教授/Assoc. Prof.
部门 Department	管理学院/School of Management
单位 Organization	西北工业大学/Northwestern Polytechnical University
城市/地区 City/Region	西安/Xi'an

Organizer's Brief Biography

中文：吴蓓，西北工业大学管理学院副教授、博士生导师。主要研究方向为系统韧性、可靠性与维修性管理。在 IISE Transactions, IEEE TEM, NRL 及《系统工程理论与实践》等国内外权威期刊发表论文 44 篇（SCI 收录 38 篇）。主持国家自然科学基金面上、青年项目等。

英文：Bei Wu is an Associate Professor and Ph.D. Supervisor at School of Management, Northwestern Polytechnical University. Her research focuses on system resilience, reliability, and maintainability management. She has published 44 papers (38 indexed by SCI) in prestigious journals such as IISE Transactions, IEEE TEM, and Naval Research Logistics. She has presided government-funded projects, including grants from the National Natural Science Foundation of China (General Program and Youth Program).