Special Session IV

Special Session Basic Information:

专栏题目 **Session Title**	中文：人工智能赋能的制造系统可靠性工程研究 英文：Artificial Intelligence for Reliability Engineering of Manufacturing Systems

专栏介绍和征稿主题
Introduction and topics

中文：随着制造业向数字化、智能化与高度集成方向发展，传统可靠性分析方法在处理多源异构数据、复杂失效机理以及动态运行环境方面面临新的挑战，例如失效数据稀缺、机理难以显式建模以及工程知识分散等问题。人工智能（AI）的发展，例如大语言模型等生成式智能技术的兴起，为可靠性建模、故障分析与维护决策提供了新的技术手段。本专题聚焦制造业中 AI 技术在可靠性工程中的方法与应用，涵盖数据与知识建模、智能分析模型构建以及可靠性评估与决策支持等研究，旨在推动 AI 技术与可靠性理论在制造业中的融合发展及工程实践。征稿主题包括但不限于：

1. 基于 AI 的可靠性建模与安全评估方法；
2. 数字孪生驱动的可靠性工程；
3. 生成式 AI 在可靠性工程中的应用；
4. 工业知识挖掘与可靠性数据建模方法；
5. 工业场景下 AI 的可信性与可靠性评估方法；
6. 基于 AI 的可靠性设计与维护决策方法。

英文：As the manufacturing industry moves toward digitalization, intelligence, and high levels of system integration, traditional reliability analysis methods are facing new challenges in data sources obtaining, failure mechanisms modeling, and supporting decision-making. The development of artificial intelligence (AI), particularly generative intelligence technologies, provides new approaches for reliability modeling, fault analysis, and maintenance decision-making. This special session focuses on the methods and applications of AI in reliability engineering within the manufacturing industry. The session aims to promote the integration of AI technologies with reliability theory and to facilitate their application in manufacturing engineering practice. Topics of interest include, but are not limited to:

1. AI-based reliability modeling and safety assessment methods;
2. Digital twin-driven reliability engineering;
3. Applications of generative AI in reliability engineering;
4. Engineering knowledge mining and reliability data modeling methods;
5. Trustworthy AI and reliability evaluation methods in industrial scenarios;
6. AI-based reliability-oriented design and maintenance decision-making methods.

Special Session Chair(s):

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Organizer's Brief Biography

中文：王兴志，西北工业大学机电学院教授、博士生导师。主要从事环境适应性设计、可靠性设计、循环设计与产品生命周期工程等方向研究。在 Journal of Manufacturing Systems、ASME Transactions、Journal of Engineering Design 等国际机械制造领域知名期刊上发表论文 24 篇，合作出版英文专著《Data-Driven Engineering Design》一部。主持或参与澳大利亚教育部基金、澳大利亚研究委员基金、国际合作基金、民机专项等课题。

英文：Xingzhi Wang is a Professor at the School of Mechanical Engineering, Northwestern Polytechnical University. His research focuses on environmental adaptability design, design for reliability, circular design, and product lifecycle engineering. He has published 24 papers in prestigious journals, such as Journal of Manufacturing Systems, ASME Transactions, and Journal of Engineering Design. He is also a co-author of the monograph Data-Driven Engineering Design. Prof. Wang has led or participated in several research projects funded by the Australian Government Department of Education, the Australian Research Council, international collaboration programs, the Civil Aircraft Project, etc.