Program at A Glance

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Detailed Timetable

July 27 [Thursday] 8:30-12:00

Time \ Room	Grand Banquet Hall	
08:30-09:00	**Opening Ceremony**	
09:00-09:40	**Chair:** Prof. Yu Liu University of Electronic Science and Technology of China, China	**Keynote Speech 1:** Carlos Guedes Soares, PhD, Professor, University of Lisbon, Portugal **Strategies for Maintenance Planning of Floating Offshore Wind Turbines**
09:40-10:20	**Chair:** Prof. Xiaoyue Wu National University of Defense Technology, China	**Keynote Speech 2:** Loon Ching Tang, PhD, Professor National University of Singapore, Singapore **Reliability Engineering: From Practice to Theory**
10:20-10:40	***Tea Break***	
10:40-11:20	**Chair:** Prof. Shubin Si Northwestern Polytechnical University, China	**Keynote Speech 3:** Lu Jin, PhD, Professor University of Electro-Communications, Tokyo **Optimal Policies for Condition-based Maintenance**
11:20-12:00	**Chair:** Prof. Hui Xiao South Western University of Finance and Economics, China	**Keynote Speech 4:** Yiliu Liu, PhD, Professor, Norwegian University of Science and Technology, Norway **Sustainable safety and safe sustainability: Some Nordic experiences**
12:00-14:00	***Lunch***	

July 27 [Thursday] 14:00-16:10

Time \ Room		Conference Room 1	Conference Room 2	Conference Room 9	Conference Room 10	Conference Room 11
Conference Topic		Fault prognosis and predictive maintenance of energy infrastructures	Machine Learning Enforced Structural Reliability Analysis and Design Optimization	Advanced Structural Reliability Methods and Design Under Uncertainty	Dynamic Methods in Reliability and Maintenance	Reliability and Maintenance Modeling and Optimization of Multi-state Systems
Oral Session A	**14:00-14:20**	QR2MSE 2023-08-0070	QR2MSE 2023-04-0061	QR2MSE 2023-01-0012	QR2MSE 2023-08-0019	QR2MSE 2023-01-0006
	14:20-14:40	QR2MSE 2023-04-0049	QR2MSE 2023-08-0061	QR2MSE 2023-03-0031	QR2MSE 2023-08-0022	QR2MSE 2023-01-0003
	14:40-15:00	QR2MSE 2023-04-0063	QR2MSE 2023-08-0062	QR2MSE 2023-04-0036	QR2MSE 2023-04-0059	QR2MSE 2023-01-0035
	15:00-15:20	QR2MSE 2023-04-0064	QR2MSE 2023-03-0016	QR2MSE 2023-01-0013	QR2MSE 2023-08-0049	QR2MSE 2023-01-0049
	15:20-15:40	QR2MSE 2023-04-0065	QR2MSE 2023-02-0026	QR2MSE 2023-01-0014	QR2MSE 2023-08-0001	QR2MSE 2023-02-0009
15:40-16:10		***Tea Break***				

July 27 [Thursday] 16:10-18:00

Time \ Room		Conference Room 1	Conference Room 2	Conference Room 9	Conference Room 10	Conference Room 11
Conference Topic		Fault prognosis and predictive maintenance of energy infrastructures	The applications of intelligent prognostics and health management	Reliability modeling and maintenance optimization for complex systems	Modelling and optimization of network security risk and reliability	Reliability and Maintenance Modeling and Optimization of Multi-state Systems
Oral Session B	**16:10-16:30**	QR2MSE 2023-03-0010	QR2MSE 2023-04-0030	QR2MSE 2023-03-0020	QR2MSE 2023-08-0054	QR2MSE 2023-06-0001
	16:30-16:50	QR2MSE 2023-04-0001	QR2MSE 2023-04-0054	QR2MSE 2023-08-0012	QR2MSE 2023-08-0057	QR2MSE 2023-06-0002
	16:50-17:10	QR2MSE 2023-04-0039	QR2MSE 2023-04-0020	QR2MSE 2023-02-0022	QR2MSE 2023-08-0052	QR2MSE 2023-02-0003
	17:10-17:30	QR2MSE 2023-04-0014	QR2MSE 2023-08-0081	QR2MSE 2023-01-0007	QR2MSE 2023-08-0055	QR2MSE 2023-03-0027
	17:30-17:50	QR2MSE 2023-04-0017	QR2MSE 2023-02-0005	QR2MSE 2023-01-0038	QR2MSE 2023-08-0056	QR2MSE 2023-02-0021
18:00		***Dinner***				

July 28 [Friday] 08:30-12:00

Time \ Room	Grand Banquet Hall	
08:30-09:10	**Chair:** Prof. Renyan Jiang Wenzhou University, China	**Keynote Speech 5:** Won Young Yun, PhD, Professor Pusan National University, Korea **Location Problems in Lamp Systems Considering System Reliability**
09:10-09:50	**Chair:** Prof. Bo Guo National University of Defense Technology, China	**Keynote Speech 6:** Hu-Chen Liu, PhD, Chair Professor Tongji University, China **Intelligent Quality Management: Theoretical Framework, Key Technologies, and Research Prospect**
09:50-10:20	***Tea Break***	
10:20-11:00	**Chair:** Prof. Yisha Xiang University of Houston, USA	**Keynote Speech 7:** Yuan Chen, PhD, Research Professor The Fifth Electronics Research Institute of the Ministry of Industry and Information Technology, China **Ruggedness and Reliability of SiC MOSFETs**
11:00-11:40	**Chair:** Prof. Gongbo Zhou China University of Mining and Technology, China	**Keynote Speech 8:** Yunhui Mei, PhD, Professor Tiangong University, China **Power semiconductor device packaging targeting at high reliability**
11:40-14:00	***Lunch***	

July 28 [Friday] 14:00-16:10

Time \ Room		Conference Room 1	Conference Room 2	Conference Room 9	Conference Room 10	Conference Room 11
Conference Topic		Data-driven Quality Modeling and Control	Identification and Classification Methods in Prognostic and Health Management	Reinforcement Learning in Maintenance Optimization	Rotating machinery condition monitoring and fault detection	Deep Learning in reliability and UQ
Oral Session C	**14:00-14:20**	QR2MSE 2023-08-0046	QR2MSE 2023-03-0029	QR2MSE 2023-08-0064	QR2MSE 2023-01-0050	QR2MSE 2023-07-0015
	14:20-14:40	QR2MSE 2023-08-0051	QR2MSE 2023-04-0044	QR2MSE 2023-08-0065	QR2MSE 2023-03-0034	QR2MSE 2023-08-0060
	14:40-15:00	QR2MSE 2023-02-0033	QR2MSE 2023-04-0045	QR2MSE 2023-08-0066	QR2MSE 2023-04-0002	QR2MSE 2023-02-0007
	15:00-15:20	QR2MSE 2023-08-0041	QR2MSE 2023-07-0021	QR2MSE 2023-08-0067	QR2MSE 2023-04-0060	QR2MSE 2023-01-0022
	15:20-15:40	QR2MSE 2023-01-0011	QR2MSE 2023-07-0020	QR2MSE 2023-08-0068	QR2MSE 2023-04-0062	QR2MSE 2023-08-0029
15:40-16:10		***Tea Break***				

July 28 [Friday] 16:10-19:00

Time \ Room		Conference Room 1	Conference Room 2	Conference Room 9	Conference Room 10	Conference Room 11
Conference Topic		Data-driven Quality Modeling and Control	Identification and Classification Methods in Prognostic and Health Management	System Reliability & Resilience Decision-Making and Optimization	Reliability Modeling and Risk Analysis	Data Fusion for System Reliability Assessment and Predictive Maintenance
Oral Session D	**16:10-16:30**	QR2MSE 2023-08-0042	QR2MSE 2023-07-0019	QR2MSE 2023-02-0029	QR2MSE 2023-08-0077	QR2MSE 2023-08-0058
	16:30-16:50	QR2MSE 2023-04-0053	QR2MSE 2023-08-0039	QR2MSE 2023-02-0032	QR2MSE 2023-01-0040	QR2MSE 2023-08-0047
	16:50-17:10	QR2MSE 2023-04-0022	QR2MSE 2023-02-0025	QR2MSE 2023-04-0066	QR2MSE 2023-03-0035	QR2MSE 2023-04-0012
	17:10-17:30	QR2MSE 2023-08-0002	QR2MSE 2023-06-0004	QR2MSE 2023-03-0011	QR2MSE 2023-01-0016	QR2MSE 2023-01-0019
	17:30-17:50	QR2MSE 2023-07-0010	QR2MSE 2023-04-0015	QR2MSE 2023-03-0025	QR2MSE 2023-01-0017	QR2MSE 2023-06-0005
19:00		***Banquet***				

July 29 [Saturday] 08:30-11:30

Room / Time		Conference Room 1	Conference Room 2	Conference Room 9	Conference Room 10	Conference Room 11
Conference Topic		Fault Diagnosis, Prognosis, Condition Monitoring and PHM	Failure Physics, Reliability Analysis and Testing	System Analysis, Simulation and Optimization	Reliability Modeling and Risk Analysis	Reliability, Maintainability, and Supportability
Oral Session E	**08:30-08:50**	QR2MSE 2023-04-0037	QR2MSE 2023-05-0001	QR2MSE 2023-08-0006	QR2MSE 2023-08-0005	QR2MSE 2023-08-0073
	08:50-09:10	QR2MSE 2023-04-0025	QR2MSE 2023-08-0011	QR2MSE 2023-08-0007	QR2MSE 2023-04-0004	QR2MSE 2023-08-0071
	09:10-09:30	QR2MSE 2023-04-0021	QR2MSE 2023-07-0006	QR2MSE 2023-08-0008	QR2MSE 2023-08-0078	QR2MSE 2023-08-0072
	09:30-09:50	QR2MSE 2023-04-0071	QR2MSE 2023-07-0014	QR2MSE 2023-08-0009	QR2MSE 2023-01-0001	QR2MSE 2023-08-0075
	09:50-10:10	QR2MSE 2023-03-0002	QR2MSE 2023-07-0016	QR2MSE 2023-02-0030	QR2MSE 2023-01-0061	QR2MSE 2023-08-0076
	10:10-10:30	QR2MSE 2023-01-0053	QR2MSE 2023-08-0016	QR2MSE 2023-02-0031	QR2MSE 2023-01-0004	QR2MSE 2023-08-0079
	10:30-10:50				QR2MSE 2023-04-0075	
11:30		***Lunch***				

VI. Technical Program

July 27 [Thursday] Oral Session A in Conference Room 1

14:00-15:40 **Fault prognosis and predictive maintenance of energy infrastructures**

Moderators: He Li, University of Lisbon, Portugal
Zifei Xu, Liverpool John Moores University, United Kingdom

14:00-14:20 QR2MSE2023-08-0070 Personalized federated transfer learning for customized fault prognosis of heterogeneous clients with data privacy / *Cheng-Geng Huang (National University of Singapore), He Li, Weiwen Peng*

This paper develops a novel personalized federated transfer learning (PFTL)-based framework for customized health prognosis of multiple heterogeneous clients.

14:20-14:40 QR2MSE2023-04-0049 Data-driven uncertatinty quantification and reduction of degradation model for prgognostic health monitoring / *Chen Jiang (Seoul National University), Haobo Qiu, Liang Gao, Byeng D. Youn*

This paper presents a data-driven uncertainty quantification and reduction methodology that improves the predictive power of physical degradation models by calibrating uncertain model parameters.

14:40-15:00 QR2MSE2023-04-0063 A hybrid intelligent method for fault diagnosis in drilling pumps using WKN-bilstm and attention mechanism / *Jiang Wang (School of Mechatronic Engineering), Junyu Guo*

A hybrid intelligent fault diagnosis method is proposed for drilling pumps via the WKN-BILSTM and attention mechanism.

15:00-15:20 QR2MSE2023-04-0064 Fault diagnosis in drilling pumps using WKN-CBAM-BRT neural network / *Yulai Yang (Southwest Petroleum University), Junyu Guo*

A novel fault diagnosis method is proposed for drilling pumps using the Wavelet Kernel Network - CBAM - Block-Recurrent Transformer) neural network.

15:20-15:40 QR2MSE2023-04-0065 Machine learning-based prediction of fatigue strength for ferrous alloy / *Xueping Zan (Southwest Petroleum University), Junyu Guo*

In this paper, a fatigue strength dataset is established and a machine learning regression model is applied to achieve fast and efficient fatigue strength prediction of ferrous alloy.

15:40-16:10 Tea Break

July 27 [Thursday] Oral Session A in Conference Room 2

14:00-15:40 **Machine Learning Enforced Structural Reliability Analysis and Design Optimization**

Moderators: Fenfen Xiong, Beijing Institute of Technology, China
Zhe Zhang, Hunan University, China

14:00-14:20 QR2MSE2023-04-0061 A data-driven framework of predicting the effective switching cycles of on-load tap-changer considering degradation / *Jinyan Duan (Xi'an Jiaotong University), Qiangqiang Zhao, Tengfei Wu, Jinhua Zhang, Jun Hong*

This paper explores a method for estimating the number of effective switching cycles of an on-load tap-changer based on the Kriging model.

14:20-14:40 QR2MSE2023-08-0061 A transfer learning enforced structural reliability-based design optimization method / *Li Chen (Hunan University), Zhe Zhang, Gang Yang*

This paper proposes a transfer learning method to solve the sampling-based RBDO problem.

14:40-15:00 QR2MSE2023-08-0062 Novel symmetric divergence based importance measures for engineering simulation models under uncertainty / *Wei Li (Nanjing University of Aeronautics and Astronautics), Xueying Wang*

In this research, the symmetric Kullback-Leibler (SKL) divergence and Jensen-Shannon divergence (JSD) are introduced based on symmetric types of statistical divergences.

15:00-15:20 QR2MSE2023-03-0016 Surrogate modeling of engine performance parameters using regularzing generative adversarial networks / *Fanshu Zhao (Beihang University), Jin Cui, Mei Yuan, Weiqi Yi*

A new surrogate modelling approach based on regular generative adversarial models is proposed, which has higher accuracy and successfully captures the essential features of surrogate objects.

15:20-15:40 QR2MSE2023-02-0026 A Condition-based Maintenance Decision Optimization for Warm Standby System / *Yunke Wang (Wenzhou University), Zhu Liu, Yuezhou Zheng, Lin Wang, Runze Huang, Peng Yang*

The paper studies a two-component warm standby system with priority, jointly optimizing the production maintenance policies, and switching strategies.

15:40-16:10 Tea Break

July 27 [Thursday] Oral Session A in Conference room 9

14:00-15:40 **Advanced Structural Reliability Methods and Design Under Uncertainty**

Moderators: Hongshuang Li, Nanjing University of Aeronautics and Astronautics, China
Sifeng Bi, University of Strathclyde, UK
Yuanzhuo Ma, Hohai University, China

14:00-14:20 QR2MSE2023-01-0012 Reliability analysis of gear meshing / *Yuanzhuo Ma (Hohai University), Chenxu Li, Hongshuang Li, Zhenzhou Zhao*

In this study, the finite element model of the gear was constructed using ANSYS software and ANSYS Parametric Design Language (APDL)

14:20-14:40 QR2MSE2023-03-0031 A reliability-based multiobjective optimization method based on generalized subset simulation / *Anai Ding (Nanjing University of Aeronautics and Astronautics), Hongshuang Li, Qitao Zhu, Yi Li*

In this paper, a reliable multi-objective optimization method based on generalized subset simulation (GSS) is proposed, where GSS is used to efficiently evaluate the probabilistic constraints of each solution.

14:40-15:00 QR2MSE2023-04-0036 Fatigue crack growth prediction based on a novel resampling particle filter method and multi-model / *Yi Li (Nanjing University of Aeronautics and Astronautics), Anai Dingl, Hongshuang Li*

In this paper, a new particle filtering algorithm is proposed, which combines the improved Metropolis-Hastin-Gs algorithm and resampling methods.

15:00-15:20 QR2MSE2023-01-0013 Reliability analysis of aero-disk crack growth considering correlation / *Haoyuan Di (Nanjing University of Aeronautics and Astronautics), Hang Nan, Anai Ding, Hongshuang Li*

In this study, a Copula model for the hazardous regions in the disk system was established by using the D-Vine model.

15:20-15:40 QR2MSE2023-01-0014 Impact reliability analysis of isolation system shock absorber / *Hongyi An (Northwestern Polytechnical University), Zhonghui Qiu, Xi Liu, Rongqiao Wang, Dianyin Hu*

In this paper, reliability of the shock absorber under the corresponding working conditions is calculated through Monte Carlo sampling simulation combined with finite element calculation and BP neural network surrogate model.

15:40-16:10 Tea Break

July 27 [Thursday] Oral Session A in Conference Room 10

14:00-15:40 **Dynamic Methods in Reliability and Maintenance**

Moderators: Xiujie Zhao, Tianjin University, China

Jianyu Xu, Xian Jiaotong-Liverpool University, China

14:00-14:20 QR2MSE2023-08-0019 A novel modeling framework for a degrading system subject to hierarchical inspection and maintenance policy / *Aibo Zhang (University of Science and Technology Beijing), Xingheng Liu, Zhiying Wu, Min Xie*

A hierarchical maintenance model to incorporate collected system performance information from these inspection interventions is proposed in this paper.

14:20-14:40 QR2MSE2023-08-0022 Condition-based maintenance of a multi-component system in a dynamic operating condition / *Nan Zhang (Beijing Institute of Technology)*

A hierarchical maintenance model to incorporate collected system performance information from these inspection interventions is proposed in this paper.

14:40-15:00 QR2MSE2023-04-0059 Predictive maintenance under carbon-induced deterioration: a Semi-Markov decision process approach / *Chunhui Guo (Tsinghua University), Zhenglin Liang*

In this paper, a semi-Markov decision process is used to model carbon-induced deterioration, and in addition a stage-type distribution is used to approximate the duration distribution of infrastructure states.

15:00-15:20 QR2MSE2023-08-0049 Maintenance policy considering production rate and quality / *Xiujie Zhao (Tianjin University)*

In this paper, the optimal maintenance policy considering the production rate and quality degradation in manufacturing systems is studied.

15:20-15:40 QR2MSE2023-08-0001 The first order time-variant reliability expansion method for time-variant reliability problem / *Weiwei Chen (Hunan University), Wanyi Tian, Bingyu Ni*

This paper proposes a First Order Time-Variant Reliability Expansion (FOTRE) method that offers an "adaptive accuracy of crossing rate.

15:40-16:10 Tea Break

July 27 [Thursday] Oral Session A in Conference Room 11

14:00-15:40 Reliability and Maintenance Modeling and Optimization of Multi-state Systems

Moderators: Kunxiang Yi, Hunan University of Technology and Business, China
Hui Xiao, Southwestern University of Finance and Economics, China

14:00-14:20 QR2MSE2023-01-0006 Optimal strategy of defending capacitated systems against sequential intentional and unintentional impacts / *Chen Lin (Hunan University of Technology and Business), Kunxiang Yi*

This paper studies the optimal defense strategies of defending a capacitated system against sequential unintentional and intentional impacts.

14:20-14:40 QR2MSE2023-01-0003 Reliability-based design optimization based on weighted simulation and Kriging model / *Yanshan Li (University of Electronic Science and Technology of China), Ningcong Xiao, Hongyou Zhan*

This paper extends a method by combining adaptive Kriging models, and time-consuming simulations can be replaced by Kriging models to reduce computational burden.

14:40-15:00 QR2MSE2023-01-0035 Dynamic performance evaluation of two-dimensional phased-mission systems with warm standby elements / *Kunxiang Yi (Hunan University of Technology and Business)*

This research studies a two-dimensional sliding window system with binary state units arranged in a $M \times N$ matrix. Each unit has several nonrepairable elements.

15:00-15:20 QR2MSE2023-01-0049 Extended reliability modeling and simulation of multi-state production systems based on dynamic fault tree / *Jie Xuan (Beihang University), Guangyan Zhao*

In this paper, the concept of dynamic fault tree has been extended from a binary state system to a multi-state system.

15:20-15:40 QR2MSE2023-02-0009 Optimal maintenance strategy incorporating reuse policy for a single-unit system with two failure modes / *Hui Xiao (Southwestern University of Finance and Economics), Yuxin Xian*

The paper proposes a three-stage delay time model with imperfect identification incorporating reuse action.

15:40-16:10 Tea Break

July 27 [Thursday] Oral Session B in Conference Room 1

16:10-18:00 **Fault prognosis and predictive maintenance of energy infrastructures**

Moderators: He Li, University of Lisbon, Portugal
Weiwen Peng, Sun Yat-sen University, China

16:10-16:30 QR2MSE2023-03-0010 Start-up strategy optimization of onsite monitoring systems with multifunctional sensors considering system resilience / *Jiangbin Zhao (Xi'an University of Science and Technology), Mengtao Liang, Zaoyan Zhang, Xiangang Cao, Zhiqiang Cai*

This paper establishes the mathematical model of OMS start-up strategy optimization considering known risks and proposes a two-stage local search-based genetic algorithm (TLSGA) to determine the optimal start-up strategy.

16:30-16:50 QR2MSE2023-04-0001 Research on end-to-end fault prediction method of rolling bearing based on deep learning / *Hang Xu (Henan University of Science and Technology), Junxing Li, Xianzhao Jia, Ming Qiu*

In this paper, a method based on Convolutional Neural Network (CNN) and Bidirectional Long Short-Term Memory (BiLSTM) is proposed for solving the problem that the selection of time-domain and frequency-domain features.

16:50-17:10 QR2MSE2023-04-0039 A review on deep learning in fault analysis of complex systems / *Zheng Huang (University of Electronic Science and Technology of China), Guangyu Chen, Ling Tang, Faping Shui, Xiaolong Wang*

This paper introduces in detail the application research and development of four common deep learning models in fault diagnosis and prognosis: auto encoder and its variants, deep belief network, convolutional neural network and recurrent neural network.

17:10-17:30 QR2MSE2023-04-0014 Rolling bearing intelligent fault diagnosis method based on MCNN-BILSTM-SVM / *Ronghua Chen (Jiangxi University of Science and Technology), Yiliu Gu, Jing Li, Guangqi Qiu, Yingkui Gu*

This paper proposes a rolling bearing intelligent fault diagnosis method based on multi-scale convolution neural network, bi-directional long short term memory and support vector machine (MCNN-BiLSTM-SVM).

17:30-17:50 QR2MSE2023-04-0017 Fault Diagnosis of High-speed Train Braking System Based on Graph Diffusion Convolution Model / *Nianzi Liu (Beihang University), Wen Wang, Chong Wang, Jie Liu*

In this paper, a fault diagnosis model of high-speed train braking system based on graph diffusion model is established by combining graph neural network and causality.

18:00 Dinner

July 27 [Thursday] Oral Session B in Conference Room 2

16:10-18:00 **The applications of intelligent prognostics and health management**

Moderators: Huyang Xu, Chengdu University of Technology, China
Xiaoling Zhang, University of Electronic Science and Technology of China, China

16:10-16:30 QR2MSE2023-04-0030 Research on the maturity assessment method of intelligent phm for groundwater cirulation wel / *Bingrui Yang (Chengdu University of Technology), Lianjie Zhang, Ruifeng Yang, Zhu Miao, Peng Wang, Shengyan Pu, Huyang Xu*

In this paper, based on RPL, an intelligent PHM system is designed to predict potential failures of GCW systems based on the relationship between performance degradation and failure time of GCW systems.

16:30-16:50 QR2MSE2023-04-0054 A method for bearing health condition assessment based on a-r tcn observer / *Kunpeng Li (University of Electronic Science and Technology of China)，Zhiguo Wang, Jinhua Mi, Guoming Li, Libing Bai*

This paper proposes the Attention-Residual Temporal Convolutional Network (A-R TCN), which combines the two and uses residual connectivity as an observer.

16:50-17:10 QR2MSE2023-04-0020 Design of prognostic and health management system for CO_2 geological storage body / *Lianjie Zhang (Chengdu University of Technology), Zheng Li, Huyang Xu, Xiaoguang Wang*

In this paper, using prognostic and health management theory, a set of fault prediction and health management system for CO2 geological storage body is designed

17:10-17:30 QR2MSE2023-08-0081 Fast Bayesian inference of reparameterized gamma process with random effects / *Ancha Xu (Zhejiang Gongshang University)*

This paper proposes a reparameterized gamma process with random effects in this article.

17:30-17:50 QR2MSE2023-02-0005 Life distribution modeling for a buffered two-machine serial production system / *Yukun Wang (Tianjin Chengjian University), Weizheng Gao, Xiaopeng Li*

The paper focuses on the fundamental issue by collecting equipment failure time data from a certain enterprise, determining the data model, estimating its parameters.

18:00 Dinner

July 27 [Thursday] Oral Session B in Conference Room 9

16:10-18:00 **Reliability modeling and maintenance optimization for complex systems**

Moderators: Aibo Zhang, University of Science and Technology Beijing, China
Xiangyu Li, Taiyuan University of Technology, China

16:10-16:30 QR2MSE2023-03-0020 Conditions for monotone maintenance policy in partially observable Markovian systems with population heterogeneity / *Mizuki Kasuya (University of Electro-Communications), Lu Jin*

This paper formulated the optimal decision-making problem for condition-based maintenance as a partially observable Markov decision process.

16:30-16:50 QR2MSE2023-08-0012 Global sensitivity analysis for dynamic parameters considering spacetime two-dimensionaltorque responses / *Shunyu Wang (Hebei University of Technology), Jinhui Wu, Pengpeng Tian, Yourui Tao*

In this study, the global sensitivity analysis (GSA) method is used to quantify the dynamic parameters sensitivity of a 6-degree-of-freedom (DoF) industrial robot.

16:50-17:10 QR2MSE2023-02-0022 Reliability-based topology optimization using the sequential optimization and reliability assessment / *Yaqing Lv (Northwestern Polytechnical University), Shufang Song, Zhiwei Bai*

A novel reliability-based topology optimization (RBTO) method is proposed to fully consider the uncertainties in structural design and topology optimization.

17:10-17:30 QR2MSE2023-01-0007 Reliability analysis of a loading dependent system with cascading failures considering overloads / *Yixin Zhao (Norwegian University of Science), Tianqi Sun, Yiliu Liu*

In this paper, researchers have evaluated the system reliability of the loading dependent system considering overloading state based on the multi-state CASCADE model.

17:30-17:50 QR2MSE2023-01-0038 Bayesian optimization-aided line sampling for estimating small failure probabilities / *Yifan Cui (Northwestern Polytechnical University), Jingwen Song, Yan Dang, Ting Yue, Tao Wu*

This paper brings up an algorithm called Constrained Bayesian Subset Optimization that is specially developed for actively learning the MPPs for the reliability problems with rare events.

18:00 Dinner

July 27 [Thursday] Oral Session B in Conference Room 10

16:10-18:00 **Modelling and optimization of network security risk and reliability**

Moderators: Gaofeng Da, Nanjing University of Aeronautics and Astronautics, China
Peng Zhao, Jiangsu Normal University, China

16:10-16:30 QR2MSE2023-08-0054 PCI prediction of pavement performance indicators in gansu province based on hierarchical model / *Tao Chen (Gansu Provincial Highway Business Development Centre), Ming Zeng, Yao Yu, Xiaoxiao Hu*

This paper uses a Bayesian hierarchical regression model to develop a prediction model for one of the key performance indicators of pavement damage index (PCI)

16:30-16:50 QR2MSE2023-08-0057 Stochastic orders and distortion risk contribution ratio measures / *Yiying Zhang (Southern University of Science and Technology)*

In this paper, the stochastic orders and distortion risk contribution ratio measures are studied to quantify relative spillover effects induced by systemic risks.

16:50-17:10 QR2MSE2023-08-0052 A multivariate frequency-severity framework for healthcare data breaches / *Hong Sun (Lanzhou University), Maochao Xu, Peng Zhao*

A novel multivariate frequency-severity framework to analyze breach frequency and the number of affected individuals at the state level is proposed in this paper.

17:10-17:30 QR2MSE2023-08-0055 Structural models for fog computing based internet of things architectures with insurance and risk management applications / *Xiaoyu Zhang (University of Science and Technology of China), Maochao Xu, Jianxi Su, Peng Zhao*

This analyses the cybersecurity risks involved in the fog computing technology which has been intensively deployed in assorted Internet of Things (IoT) applications.

17:30-17:50 QR2MSE2023-08-0056 EBICOP: ensemble bivariate copulas for modeling multivariate cyber data breach risks with insurance applications / *Yijia Li (University of Science and Technology of China), Quynh N. Nguyen, Maochao Xu, Peng Zhao, Taizhong Hu*

This paper proposes a novel ensemble learning approach that effectively captures both the temporal and cross-sectional dependence inherent in cyber risks.

18:00 Dinner

July 27 [Thursday] Oral Session B in Conference Room 11

16:10-18:00 **Reliability and Maintenance Modeling and Optimization of Multi-state Systems**

Moderators: Kunxiang Yi, Hunan University of Technology and Business, China
Hui Xiao, Southwestern University of Finance and Economics, China

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16:10-16:30 QR2MSE2023-06-0001 A geometric process-based post-warranty maintenance model / *Peng Liu (Southeast University), Guanjun Wang*

In this paper, an optimal post-warranty repair strategy is studied based on geometric process maintenance theory.

16:30-16:50 QR2MSE2023-06-0002 Joint optimization of condition-based maintenance and spare ordering for a partially observable multi-state system / *Xia Tang (Southwestern University of Finance and Economics), Hui Xiao, Ling Li*

This paper focuses on the joint optimization of condition-based maintenance and spare parts ordering for a partially observable multistate system

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16:50-17:10 QR2MSE2023-02-0003 Condition-based maintenance plan for multi-state systems using reinforcement learning / *Shuyuan Gan (Jiangsu University)*

In this paper, a new dynamic condition-based maintenance model is presented for a degrading system using a reinforcement learning approach.

17:10-17:30 QR2MSE2023-03-0027 Optimization of non-normal distribution for product tolerance considering asymmetric cubic quality loss / *Jingang Wang (Shanghai University of Engineering Science), Xintian Liu, Kai Jin*

In this paper, in order to optimize the trapezoidal distribution of process averages, a mathematical model for calculating the expected quality loss is proposed, taking into account the different distances between the target value and the process averages.

17:30-17:50 QR2MSE2023-02-0021 Emergency braking reliability analysis of high-speed and heavy-load monorail crane / *Hao Lu (China University of Mining and Technology), Jiarong Zhang, Hui Jiang*

The paper analyzes the impact of several important parameters on the dynamic characteristics and temperature of the monorail crane's emergency braking system.

18:00 Dinner

July 28 [Friday] Oral Session C in Conference Room 1

14:00-15:40 **Data-driven Quality Modeling and Control**

Moderators: Shichang Du, Shanghai Jiao Tong University, China
Yiping Shao, Zhejiang University of Technology, China

14:00-14:20 QR2MSE2023-08-0046 Combining the physics and deep transfer learning for rolling bearing prognostic across different machines / *Yafei Deng (Shanghai Jiao Tong University), Shichang Du, Yiping Shao*

This paper proposes a calibrated-based hybrid transfer learning framework to improve model generality without sacrificing interpretability.

14:20-14:40 QR2MSE2023-08-0051 Fixture layout optimization for large thin-walled parts based on IPSO algorithm / *Changhui Liu (Tongji University), Ying Zheng, Jing Wang, Ke Jin, Jianbo Yu, Jianfeng Liu*

In this paper, the influence of the fixture layout on the assembly gap is considered to reduce the part deformation.

14:40-15:00 QR2MSE2023-02-0033 Cooperative maintenance policy and pricing scheme for a leased series manufacturing system / *Yaping Li (Nanjing Forestry University), Jin Wu*

The paper establishes a cost rate optimization model for the PM policy and a lease pricing scheme considering the contribution of each supplier in the cooperation.

15:00-15:20 QR2MSE2023-08-0041 Monitoring of multivariate multimodal data: A data-driven scheme based on the Dirichlet process Gaussian mixture model / *Zhiqiong Wang (Tianjin University of Technology), Renping Gong, Lisha Song*

A data-driven scheme based on the Dirichlet process Gaussian mixture model is proposed in this paper

15:20-15:40 QR2MSE2023-01-0011 Research of enterprise development prosperity index based on the industry perspective / *Diqian Chen (Southwest University of Finance and Economics), Fei Qin, Jinkun Li*

In this paper, researchers propose a method to construct the industry prosperity index based on different dimensions such as profitability, growth and market.

15:40-16:10 Tea Break

July 28 [Friday] Oral Session C in Conference Room 2

14:00-15:40 **Identification and Classification Methods in Prognostic and Health Management**

Moderators: Zhenggeng Ye, Zhengzhou University, China
Zhiqiang Cai, Northwestern Polytechnical University, China

14:00-14:20 QR2MSE2023-03-0029 Reliability optimization for the balanced system with m linear consecutive k-out-of–n sectors / *Haibao Li (Northwestern Polytechnical University), Qiyu Wang, Zhiqiang Cai, Jiangbin Zhao*

In this paper, an optimization algorithm based on Δ-balance importance (DBAI) is designed to improve the solution accuracy and efficiency, which breaks through the limitation that the research on balanced systems mostly stays on the system reliability calculation.

14:20-14:40 QR2MSE2023-04-0044 Faults identification with deep CNN fine-tuned resnet50 model for rolling bearings / *Muhammad Abid (Northwestern Polytechnical University), Izhar ul Haq, Zhiqiang Cai, Shuai Zhang*

The proposed approach in this paper uses a pre-trained ResNet50-TL deep neural network to extract features from 2D RGB scalogram images, which were created from 1D vibration signals by using the continuous wavelet transform technique.

14:40-15:00 QR2MSE2023-04-0045 Sensor monitoring driven identification of heterogeneous working conditions for machine tool / *Zhenggeng Ye (Zhengzhou University), Yongwei Ke, Xin Wang, Zhiqiang Cai*

In this paper, a similarity evaluation method for work condition identification is proposed using various monitored sensor data.

15:00-15:20 QR2MSE2023-07-0021 A gallbladder cancer classification model based on global-local net (Northwestern Polytechnical University) / Qisheng Jiang, Jingwei Zhang, Zhimin Geng, Zhiqiang Cai

This paper establishes a classification model for gallbladder cancer and xanthogranulomatous cholecystitis through deep learning methods to provide clinical decision support for doctors.

15:20-15:40 QR2MSE2023-07-0020 OAGAN: an oversampleing approach for imbalanced data problem / *Jiali Cheng (Northwestern Polytechnical University), Bofei Wei, Feng Liu, Sijie Han, Zhiqiang Cai, Shubin Si*

An oversampling method for the minority class by adaptive synthetic sampling with conditional tabular generative adversarial network (OAGAN) is proposed in this paper.

15:40-16:10 Tea Break

July 28 [Friday] Oral Session C in Conference room 9

14:00-15:40 **Reinforcement Learning in Maintenance Optimization**

Moderators: Yisha Xiang, University of Houston, USA
Yue Shi, Wuhan University, China
Ying Liao, Texas Tech University, USA

14:00-14:20 QR2MSE2023-08-0064 Planning accelerated degradation tests with two stress variables / *Guanqi Fang (Zhejiang Gongshang University)*

In this paper, an analytical approach to address the design issue of two stress variables are present.

14:20-14:40 QR2MSE2023-08-0065 Reliability model of two-way linear multistate consecutively connected system considering signal loss and receiving ability / *Kaiye Gao (Beijing Information Science & Technology University*)

This study proposes a reliability model to study the design optimization of the two-way LMCCS considering signal loss.

14:40-15:00 QR2MSE2023-08-0066 Bayesian mixed-effect higher-order hidden Markov models with applications to predictive healthcare using electronic health records / *Ying Liao (Texas Tech University), Yisha Xiang*

A novel and flexible Bayesian mixed-effect higher-order hidden Markov model (MHOHMM), and develop a classifier based on MHOHMMs in this paper.

15:00-15:20 QR2MSE2023-08-0067 Distributional robust partially observable Markov decision processes optimization with distance-based uncertainties / *Li Tong (University of Houston), Yisha Xiang*

This paper considers the distributional robust partially observable Markov decision processes (DR-POMDP).

15:20-15:40 QR2MSE2023-08-0068 Distributionally robust Markov decision process with uncertain transition probabilities / *Yue Shi (Wuhan University), Yisha Xiang*

In this paper, a distributional robust Markov decision process (DRMDP) with a multiple-priors-based uncertainty set is proposed.

15:40-16:10 Tea Break

July 28 [Friday] Oral Session C in Conference Room 10

14:00-15:40 Rotating machinery condition monitoring and fault detection

Moderators: Di Zhou, Wenzhou University, China
Yan Ren, Wenzhou University, China

14:00-14:20 QR2MSE2023-01-0050 Characterization of a new fatigue test bench for pulsed high frequency reliability testing of hydraulic components / *Can Chen (Wenzhou University), Hesheng Tang, Jiawei Xiang, Yan Ren*

In this paper, a new two-stage high-speed reversing valve is designed inspired by the easier opening and closing of the rotary valve port.

14:20-14:40 QR2MSE2023-03-0034 Optimization of RV reducers dynamic model parameters using a whale optimization algorithm / *Hui Wang (Wenzhou University), Junkang Zheng, Jiawei Xiang*

In this paper, 24 kinetic model parameters such as rotational speed, torque, stiffness and damping were optimized using the Whale Optimization Algorithm (WOA).

14:40-15:00 QR2MSE2023-04-0002 State of health estimation for lithium batteries using improved weighted grey relational method / *Jinrui Zhang (Wenzhou University), Chenqi Song, Jiawei Xiang*

In this paper, a new approach using multi-sensor fusion technology is proposed to construct a comprehensive health indicator for predicting SOH.

15:00-15:20 QR2MSE2023-04-0060 Fault diagnosis of DC Motor-Reducer system using a h∞ unknown input observer / *Wang Sun (Wenzhou University), Jiawei Xiang*

This paper proposes a fault diagnosis method using the H∞ unknown input observer (UIO) to solve the problem that the unknown input of the DC motor-reducer system is difficult to be fully decoupled.

15:20-15:40 QR2MSE2023-04-0062 Driver abnormal behavior detection system using two-stage object detection / *Chen Wang (Wenzhou University), Liang Shao, Jun Liu, Jiawei Xiang*

In this paper, to reduce the number of traffic accident caused by driver abnormal behavior, a safety assistance system has been developed.

15:40-16:10 Tea Break

July 28 [Friday] Oral Session C in Conference Room 11

14:00-15:40 **Deep Learning in reliability and UQ**

Moderators: Zequn Wang, University of Electronic Science and technology, China
Kai Sun, Institute of Microelectronics of the Chinese Academy of Sciences, China

14:00-14:20 QR2MSE2023-07-0015 A LSTM-based Monte Carlo quantile regression method for satellite temperature prediction and data uncertainty quantification / *Yingchun Xu (National University of Defense Technology), Xiaohu Zheng, Yunyang Zhang, Ning Wang, Wen Yao, Gaoxiong Zhang*

In this paper, a LSTM-based Monte Carlo Quantile Regression method (LSTM-MCQR) is proposed to address this problem and improve prediction accuracy

14:20-14:40 QR2MSE2023-08-0060 Sequence simulation method for dynamic uncertainty analysis of rigid-flex coupling system under interval process excitation / *Yanhao Liu (Hunan University), Bingyu Ni*

This Paper proposes a sequence simulation method for dynamic uncertainty analysis of rigid-flexible coupling systems under interval process excitation

14:40-15:00 QR2MSE2023-02-0007 An NPV analysis of opportunity-based age replacement models / *Jing Wu (Hiroshima University), Cunhua Qian, Tadashi Dohi, Hiroyuki Okamura*

The paper generalizes the existing opportunity-based age replacement policies for a one-unit system by introducing the net present value (NPV) of the expected total discounted costs.

15:00-15:20 QR2MSE2023-01-0022 Human resource crisis warning for bearing manufacturing enterprises based on GRA and CV-AHP / *Yushuai Han (Henan University of Science and Technology), Junxing Li, Xianzhao Jia, Hang Xu, Jiahui Fan, Yanhui Guan*

This paper uses GRA to simplify the preliminary constructed human resource crisis early warning index system for bearing enterprises, eliminating factors with small impacts and providing convenience for subsequent calculations.

15:20-15:40 QR2MSE2023-08-0029 A fully decoupled and sampling-based Bayesian method for reliability-based design optimization / *Fangqi Hong (Northwestern Polytechnical University), Pengfei Wei*

A fully decoupled and sampling-based Bayesian method for reliability-based design optimization is studied in this paper.

15:40-16:10 Tea Break

July 28 [Friday] Oral Session D in Conference Room 1

16:10-18:00 **Data-driven Quality Modeling and Control**

Moderators: Shichang Du, Shanghai Jiao Tong University, China
Yiping Shao, Zhejiang University of Technology, China

16:10-16:30 QR2MSE2023-08-0042 Joint learning of failure mode recognition and prognostics for degradation processes / *Di Wang (Shanghai Jiao Tong University)*

This paper proposes a joint learning model of failure mode recognition and RUL prediction for degradation processes based on multiple sensor signals.

16:30-16:50 QR2MSE2023-04-0053 Introducing feature matching and smoothing loss: a novel GAN for improved sample generation / Junfeng Yang (University of Electronic Science and Technology of China), Fengchang Liu, Jinhua Mi, Shengjie Yin, Libing Bai

In this paper, an enhanced GAN network is introduced that incorporates a feature attention matching mechanism in the computation of the loss function.

16:50-17:10 QR2MSE2023-04-0022 Bearing Misalignment Identification by Adaptive Time Frequency Modal Decomposition under Time-varying Speed Operating Condition / *Jianhua Yang (Jiangsu University), Zhen Shan, Zhongqiu Wang, Jiachen Tang, Tao Gong*

In this paper, a new adaptive time-frequency modal decomposition (TFMD) method is proposed in order to identify bearing misalignment under time-varying rotational speed conditions.

17:10-17:30 QR2MSE2023-08-0002 Reliability-based lamp location problems / *Zilong Feng (Pusan National University), Qianqian Zhao, Wonyoung Yun*

This paper studies the reliability-based set coverage lamp location problem (SLP), which involves using a fixed number of lamps to cover a given system.

17:30-17:50 QR2MSE2023-07-0010 A temporal continuity clustering algorithm for spatial-temporal data based on GMM and KNN / *Jing Wang (Beijing Institute of Technology, School of Mathematics and Statistics, Beijing, China), Fengmin Wang, Yiran Zhao, Houbao Xu*

This paper applies a clustering algorithm on the datasets to explore the transferability of the algorithm and the availability of the classification results.

19:00 Banquet

July 28 [Friday] Oral Session D in Conference Room 2

16:10-18:00 **Identification and Classification Methods in Prognostic and Health Management**

Moderators: Fenfen Xiong, Beijing Institute of Technology, China
Zhe Zhang, Hunan University, China

16:10-16:30 QR2MSE2023-07-0019 Research on modeling and clustering algorithm of unmanned aerial vehicle swarm network under search task / *Ruisong Liao (Northwestern Polytechnical University), Zhifeng Zheng, Wenjin Zhu, Luohaoji Wang*

This paper firstly models the swarm based on the complex network theory, and then divides the task grids in the limited search area

16:30-16:50 QR2MSE2023-08-0039 Reconfigurable importance-based genetic algorithm for reliability-arrangement optimization of linear consecutive-k-out-of-n systems / *Dan Wang (Northwestern Polytechnical University), Shubin Si*

This study proposes a novel reliability design problem for linear consecutive-k-out-of-n systems, called reliability-arrangement optimization problem (RAOP).

16:50-17:10 QR2MSE2023-02-0025 A novel preventive maintenance policy for a balanced system / *Mengmeng Lin (Wenzhou University), Keren Wang, Hongdan Ding, Jiajia Ni, Yi Li*

The paper proposes a reliability modeling and maintenance decision-making method for a balanced system considering energy-saving.

17:10-17:30 QR2MSE2023-06-0004 Condition-Based Maintenance for degradation Systems with quality characteristics / *Ziyu Wang (Tianjin University), Xiujie Zhao*

The paper investigates the optimal maintenance strategy for manufacturing systems with the consideration of state assessment uncertainties.

17:30-17:50 QR2MSE2023-04-0015 A vision-based displacement measurement method of wind turbine blades in biaxial fatigue testing / *Xinyuan Yang (Lanzhou University of Technology), Qiang Ma, Xuezong Bai, Huidong Ma, Zongwen An*

A vision-based displacement measurement method of wind turbine blades is introduced in this paper, which collects displacement data from biaxial fatigue testing of wind turbine blades instead of existing strain data to control the loading system.

19:00 Banquet

July 28 [Friday] Oral Session D in Conference Room 9

16:10-18:00 **System Reliability & Resilience Decision-Making and Optimization**

Moderators: Dongming Fan, Beihang University, China
Zhiwei Chen, Northwestern Polytechnical University, China

16:10-16:30 QR2MSE2023-02-0029 Optimal condition-based maintenance policy for systems with competing failure / *Meiqi Huang (Wenzhou University), Chen Cheng, Yinghao Meng, Jiaqi Wu, Qingqing Ma, Xuyan Shen*

The paper investigates a novel condition-based maintenance policy for systems undergoing mutually dependent competing failure processes.

16:30-16:50 QR2MSE2023-02-0032 Reliability modeling and maintenance decision for a k-out-of-n: F system / *Caixia Jin (Wenzhou University), Ziliang Peng, Ruixiao Wu, Fengyu Yu, Yulu Xie, Huaqing Yang*

This paper develops a reliability model for critical systems of equipment under external shocks.

16:50-17:10 QR2MSE2023-04-0066 Failure analysis of subsea wellhead sealing assembly based on finite element method / *Han Gong (China University of Petroleum), Long Yu, Shengnan Wu, Li Zhong, Huanzhi Feng*

In this paper, an approach is proposed to analyze the influencing factors of sealing performance based on the metal sealing mechanism and mechanical theory.

17:10-17:30 QR2MSE2023-03-0011 An exact algorithm for the redundancy allocation problem with k-out-of-n subsystems under mixed redundancy strategy / *Jiangang Li (Northwestern Polytechnical University), Dan Wang, Shubin Si*

This paper proposes a dynamic programming algorithm based on super-components to solve the optimization model while being able to solve multiple types of RAPs.

17:30-17:50 QR2MSE2023-03-0025 Topology optimization of granular material structure model by level set method / *Haipeng Jia (Hebei University of Technology), Jingxuan Dou, Ruisheng Yu, Jiaqi Wu, Yajin Li*

In this paper, a topology optimization method for granular material structures is proposed based on the parameterized level set method.

19:00 Banquet

July 28 [Friday] Oral Session D in Conference Room 10

16:10-18:00 Reliability Modeling and Risk Analysis

Moderators: Zhangchun Tang, University of Electronic Science and Technology of China, China
Haikun Wang, Chongqing University of Technology, China

16:10-16:30 QR2MSE2023-08-0077 Reliability of wireless body area networks / *Liudong Xing (University of Massachusetts), Guilin Zhao, Qun Zhang*

In this paper, A reliability model is presented for WBANs subject to the probabilistic function dependence and associated probabilistic isolation and competing behaviors.

16:30-16:50 QR2MSE2023-01-0040 Reliability evaluation method of dependent multistate phased mission system based on nested-copulas / *Xiangyu Li (Taiyuan University of Technology), Kai Zhan, Xiaoyan Xiong*

This paper applies a hierarchical method to divide multi-dimensional random variables into multiple levels. Different Copula functions are nested at different levels to form a nested Copula function.

16:50-17:10 QR2MSE2023-03-0035 Nonlinear dynamics analysis of a new precision roller gear transmission system / *Tao Yang (Wenzhou University), Ronggang Yang*

In this paper, a two-degree-of-freedom dynamics model is developed using the concentrated mass method to investigate the nonlinear dynamics of a new precision roller gearing system.

17:10-17:30 QR2MSE2023-01-0016 Experimental design and modelling method for the probability of detection surface defects in turbine disc / *Weihan Kong (Beihang University), Rongqiao Wang, Xi Liu, Dianyin Hu, Yu Liu, Jianxing Mao*

In this paper, experiments are carried out to obtain the PoD curve for the fluorescence penetration nondestructive inspection process of aero-engine turbine disc surface defects.

17:30-17:50 QR2MSE2023-01-0017 A novel parameter estimation method for lognormal and Birnbaum-Saunders distributions on heavily censored data / *Fengping Li (Wenzhou University), Renyan Jiang, Wei Xue, Xiaogang Li, Kunpeng Zhang*

In this paper, researchers carry out two numerical experiments to validate the conjecture about the accuracy of MLE of the MTTF on heavily-censored data from a symmetric 2-parameter distribution.

19:00 Banquet

July 28 [Friday] Oral Session D in Conference Room 11

16:10-18:00 **Data Fusion for System Reliability Assessment and Predictive Maintenance**

Moderators: Fei Zhao, Northeastern University at Qinhuangdao, China
Tangfan Xiahou, University of Electronic Science and Technology of China, China

16:10-16:30 QR2MSE2023-08-0058 System redesign with uncertain failure rates / *Qianru Ge (Dongbei University of Finance and Economics), Willem van Jaarsveld, Zumbul Atan*

This paper uses the Bayesian model to update the failure rate distribution and develops a Markov decision process model to support the manufacturer's redesign decisions.

16:30-16:50 QR2MSE2023-08-0047 Reliability modeling and evaluation of multi-state heat dissipation system of a space reactor power system based on DBN / *Ziwei Chen (Hunan University), Yan Xia, Zhe Zhang, Chao Jiang*

Reliability modeling and evaluation of multi-state heat dissipation system of a space reactor power system based on DBN are studied in this paper.

16:50-17:10 QR2MSE2023-04-0012 Fault diagnosis system based on big data for spacecraft information system / *Qian Liu, Fangyuan Wen (Aerospace System Engineering Shanghai), Minjun Mao, Ping Fan, Lei Xu, Wenlong Guo, Bin Luo*

This paper presents a fault diagnosis system based on big data for spacecraft information system, which can realize the rapid diagnosis of equipment faults in the information system and make a preliminary judgement on its trend.

17:10-17:30 QR2MSE2023-01-0019 Movement reliability prediction for mechanical products considering the interaction of multiple factors / *Yan Ran (Chongqing University), Yu Ji, Xueping Li, Genbao Zhang*

On the basis of the meta-action theory, this paper takes the multiple failure modes, multiple factors influence and multiple factors coupling into the analysis.

17:30-17:50 QR2MSE2023-06-0005 Cost analysis of flexible extended warranty considering heterogeneity of field reliability performance / *Meng Zhou (Tianjin University), Xiujie Zhao, Shuguang He*

A flexible EW policy allowing delayed EW purchases within the base warranty period by considering the EW cost estimation base on the field reliability is proposed in this paper.

19:00 Banquet

July 29 [Saturday] Oral Session E in Conference Room 1

08:30-11:30 **Fault Diagnosis, Prognosis, Condition Monitoring and PHM**

Moderators: Huanwei Xu, University of Electronic Science and Technology of China, China
Peng Huang, Jiangxi University of Science and Technology, China

08:30-08:50 QR2MSE2023-04-0037 Residual fatigue life prediction for composite under variable amplitude cyclic loading: based on equivalent number of loading cycles conversion / *Zihao Feng (Lanzhou University of Technology), Zongwen An, Qiang Ma, Huidong Ma, Xuezong Bai*

In this paper, an improved method is proposed for converting the equivalent load numbers of composite materials under variable amplitude cyclic loading.

08:50-09:10 QR2MSE2023-04-0025 Failure propagation analysis study of industrial robot based on meta-action / *Jingjie Chen (Chongqing University), Yan Ran*

In this paper, a meta-action based fault propagation analysis method is proposed to find the critical units affecting the whole machine.

09:10-09:30 QR2MSE2023-04-0021 Research on fault propagation model of unmanned ground vehicle / *Rui Xing (Beihang University), Wei Zhang, Jia Sun, Xinghui Zhang*

This paper investigates a fault propagation model that analyses the classical "sense-predict-plan-control" process and tries to apply it to UGVs.

09:30-09:50 QR2MSE2023-04-0071 A performance degradation prediction method based on GPR and physics of failure for gyroscope sensor / *Songchen Zhao (University of Electronic Science and Technology of China), Xiao Yang, Siyu Tao, Xiaoling Zhang*

In this paper, the physics of failure of gyroscope and the fault characteristics of performance degradation are analyzed.

09:50-10:10 QR2MSE2023-03-0002 Reliability analysis of the hammer rotor of forage crusher under multiple failure modes / *Donghai Yuan (Inner Mongolia University of Technology), Haixu Zhao, Zhiping Zhai, Yuezheng Lan, Lixiang Zhao*

In this paper, the reliability model of hammerhead rotor under multiple failure modes is constructed, on the basis of which the reliability of forage crusher is improved by optimizing the structure and working parameters.

10:10-10:30 QR2MSE2023-01-0053 Bearing health and safety analysis to improve the reliability and efficiency of horizontal axis wind turbine / *Ali Nawaz (University of Electronic Science and Technology of China), Sajawal Gul Niazi, Tudi Huang, Hong-Zhong Huang, S. Ali. Shah*

In this paper, A proposed prognosis model of Reliability Health and Safety Analysis (RHSA) is used for the evaluation of the performance of the bearing.

11:30 Lunch

July 29 [Saturday] Oral Session E in Conference Room 2

08:30-11:30 **Failure Physics, Reliability Analysis and Testing**

Moderators: Jinhua Mi, University of Electronic Science and Technology of China, China
Yuanjian Yang, Chongqing University of Science and Technology, China

08:30-08:50 QR2MSE2023-05-0001 A new curved surface integral method for reliability analysis / *Zhenzhong Chen (Donghua University), Xiaoke Li, Zihao Wu, Dongyu Huang, Haoxun Mu, Guiming Qiu, Ge Chen, Xuehui Gan, Haobo Qiu, Liang Gao*

This paper proposes a curved surface integral (CSI) approach based on the intersection of reliability index β-circles and the parabolic constraint.

08:50-09:10 QR2MSE2023-08-0011 A novel positional accuracy reliability analysis method of industrial robots based on statistical moment similarity / *Jinhui Wu (Hebei University of Technology), Yourui Tao, Xu Han*

A new positional accuracy reliability analysis method of industrial robots is proposed based on the statistical moment similarity of positional error and saddlepoint approximation method.

09:10-09:30 QR2MSE2023-07-0006 Accelerated performance degradation test and analysis of high-temperature strain gauges / *Lu Li (Beihang University), Zhihua Wang, Ning Yang, Qiong Wu, Hanyue Wang, Zelong Mao, Kunpeng Ren, Qiuyue Wang, Yifeng Wang*

In this paper, a combination of experimental research and theoretical analysis is utilized to design and conduct the accelerated performance degradation test on high-temperature strain gauges.

09:30-09:50 QR2MSE2023-07-0014 A research of key factor of reliability of semiconductor chip: ambient temperature and junction temperature / *Kai Sun (Institute of Microelectronics of the Chinese Academy of Sciences), Maozheng Liu, Hao Wei, Chaoyue Liang, Zhe Liu, Haihang Cui, Yingjun Shen, Danyu Wu*

This paper uses finite element analysis to analyze the effects of ambient temperatures on the junction temperature of the IC chip.

09:50-10:10 QR2MSE2023-07-0016 Adaptability test research of aerospace products under impact environment / *Yiyuan Wang (Aerospace System Engineering Shanghai), Linna Wu, Xiang Zhang, Dawei Han, Xiaofeng Shen, Enhui Yuan*

In this paper, the test verification method of aerospace products to shock environment is studied.

10:10-10:30 QR2MSE2023-08-0016 A new non-probabilistic reliability sensitivity index and its Kriging solution / *Haodong Zhao (Northwestern Polytechnical University), Changcong Zhou, Qi Chang*

A new non-probabilistic reliability sensitivity index and its Kriging solution are studied in this paper.

11:30 Lunch

July 29 [Saturday] Oral Session E in Conference Room 9

08:30-11:30 **System Analysis, Simulation and Optimization**

Moderators: Zequn Wang, University of Electronic Science and Technology of China, China
Yingkui Gu, Jiangxi University of Science and Technology, China

08:30-08:50 QR2MSE2023-08-0006 Spatiotemporal analysis on the resilience of coupled railway and airline system under localized disruption / *Hui Zhang (Huazhong University of Science and Technology), Min Ouyang*

This paper develops a framework for spatiotemporal assessment on the resilience of the CRAS under two types of LDs, taking into account the time-related attributes.

08:50-09:10 QR2MSE2023-08-0007 Multi-Scale impact analysis of flooding on urban road transportation / *Chongyang Du (Huazhong University of Science and Technology), Min Ouyang*

Using flooding maps provided by the authorities and the traffic data during a historical flooding event in Wuhan, this study adopts the simulation-based framework to analyze the multi-scale impact of flooding on road transportation.

09:10-09:30 QR2MSE2023-08-0008 Railway system resilience to tropical cyclones in a changing climate / *Menglan Yang (Huazhong University of Science and Technology), Min Ouyang*

This paper proposes an approach to model and analyze the resilience of railway systems under current and future tropical cyclones.

09:30-09:50 QR2MSE2023-08-0009 Boundary effects on structural characteristics of urban road networks / *Zekai Cheng (Huazhong University of Science and Technology), Min Ouyang*

This paper conducts a large-scale empirical analysis to reveal the effects of varied boundaries on 22 structural metrics and 2 disruption scenarios of URNs across all 363 cities in mainland China.

09:50-10:10 QR2MSE2023-02-0030 Life distribution modeling for a buffered two-machine serial production system / *Hongjie Lin (Wenzhou University), Jiayao Qi, Keren Wang, Yuezhou Zheng, Feier Mao, Yuantao Lin*

The paper focuses on the fundamental issue by collecting equipment failure time data from a certain enterprise, determining the data model, estimating its parameters.

10:10-10:30 QR2MSE2023-02-0031 Maintenance decision of repairable series system with k-out-of-n F subsystems / *Yanzhe Zhang (Wenzhou University), Yuxin Liu, Lai Wei, Shuwen Ye, Xue Shen, Anming Zhang*

In the paper, multiple k-out-of-n: F systems are embedded in the series production system, and a maintenance model is established based on the limit of cumulative cost.

11:30 Lunch

July 29 [Saturday] Oral Session E in Conference Room 10

08:30-11:30 Reliability Modeling and Risk Analysis

Moderators: He Li, University of Lisbon, Portugal
Wubin Cai, University of Electronic Science and Technology of China, China

08:30-08:50 QR2MSE2023-08-0005 A decoupled framework to support resilience assessment of interdependent infrastructure system / *Yiqiong Zhang (Huazhong University of Science and Technology), Min Ouyang*

This paper proposes a decoupled framework to assess the resilience of interdependent CIS using the interdependent component information and the resilience of the single CIS without considering the interdependencies.

08:50-09:10 QR2MSE2023-04-0004 Remaining useful life prediction of spherical plain bearing based on incremental Kalman filter / *Jiahui Fan (Henan University of Science and Technology), JunXing Li, Yanhui Guan, Yushuai Han, Hang Xu*

In this paper, a new method for predicting the remaining life of joint bearings based on the incremental Kalman filter (IKF) is proposed, and the prediction accuracy of the proposed method is effectively improved compared with the traditional method.

09:10-09:30 QR2MSE2023-08-0078 Robust fault diagnosis in open set domain adaptation: adversarial attack and defense perspectives / *Zekun Li (University of Electronic Science and Technology of China), Tangfan Xiahou, Yu Liu*

In this paper a novel framework for robust open set domain adaptation is proposed for fault diagnosis.

09:30-09:50 QR2MSE2023-01-0001 Reliability evaluation model of parking lot mobile payment system considering function upgradation / *Jianfeng Yang (Guizhou University), Zhoutao Zheng, Xibin Wang, Nan Yang*

In this approach, the testing information of the pre-versions and software functional structure is fully used in up-gradation software testing.

09:50-10:10 QR2MSE2023-01-0061 Mechanical model of aero-engine rolling bearing considering temperature and lubrication / *Guang Ren (University of Electronic Science and Technology of China), Hong-Zhong Huang*

This paper proposes a mechanical model suitable for angular contact ball bearings considering temperature and lubrication effects.

10:10-10:30 QR2MSE2023-01-0004 Investigating regional effects of random inputs for multivariate outputs with generalized variance / *Jingwen Song (Northwestern Polytechnical University), Zhanhua Liang, Yueqiang Zhang*

This paper aims at developing simple and effective methods for measuring regional effects of model input variables on multivariate outputs.ries production system, and a maintenance model is established based on the limit of cumulative cost.

10:30-10:50 QR2MSE2023-04-0075 Prediction of remaining useful life of bearings using a parallel neural network / *Sajawal Gul Niazi (UESTC), Ali Nawaz, Tudi Huang, Song Bai, Hong-Zhong Huang*

This paper advocates the utilization of a parallel neural network (PNN) architecture for the estimation of remaining useful life (RUL) of bearings

11:30 Lunch

July 29 [Saturday] Oral Session E in Conference Room 11

08:30-11:30 **Reliability, Maintainability, and Supportability**

Moderators: Huaming Qian, Chongqing University, China
Ningcong Xiao, University of Electronic Science and Technology of China, China

08:30-08:50 QR2MSE2023-08-0073 Application of deep reinforcement learning in regulating space power sources / *Tingyu Zhang, Ying Zeng (University of Electronic Science and Technology of China), Sajawal Gul Niazi, Tianlong Xu, Hong-Zhong Huang*

This paper proposes a deep reinforcement learning-based algorithm for intelligent monitoring and diagnosis of power supply network faults through bus regulation techniques.

08:50-09:10 QR2MSE2023-08-0071 Fatigue spalling fault evolution analysis and life prediction of an angular contact bearing / *Zhiming Deng (University of Electronic Science and Technology of China), Xunkai Wei, Song Bai, Hong-Zhong Huang, Hao Wang*

In this paper, the mechanism analysis model of spalling area expansion is established after the bearing fatigue spalling failure.

09:10-09:30 QR2MSE2023-08-0072 Reliability analysis for aero engine gear based on active learning multi-fidelity surrogate model / *Ning Lu (University of Electronic Science and Technology of China), Yan-Feng Li, Tianlong Xu, Hong-Zhong Huang*

Based on the active learning multi-fidelity surrogate model, this paper implements a new reliability analysis method for the aero engine gear, balancing accuracy and efficiency.

09:30-09:50 QR2MSE2023-08-0075 System-Level performance degradation prediction for power converters / *Ying Zeng (University of Electronic Science and Technology of China), Tudi Huang, Tingyu Zhang, Hong-Zhong Huang*

This paper proposes a novel framework for system-level degradation predicting, which combines neural networks and empirical knowledge to predict the degradation of power converter.

09:50-10:10 QR2MSE2023-08-0076 Reliability assessment of capacitor performance degradation based on copula function / *Xin Huang (University of Electronic Science and Technology of China), Tingyu Zhang, Ying Zeng, Yan-Feng Li, Hong-Zhong Huang*

Based on the active learning multi-fidelity surrogate model, this paper implements a new reliability analysis method for the aero engine gear, balancing accuracy and efficiency.

10:10-10:30 QR2MSE2023-08-0079 Fault diagnosis method of axle box bearing based on improved VMD and Teager energy operator demodulation / *Zi-Xing Huang, Yan-Feng Li, Zhiming Deng, Ziwei Xu, Hong-Zhong Huang*

This paper proposes a fault diagnosis method based on improved VMD and Teager energy operator demodulation.

11:30 Lunch