2020 Asia-Pacific International Symposium on Advanced Reliability and Maintenance Modeling (APARM 2020)

Vancouver, British Columbia, Canada 20-23 August 2020



IEEE Catalog Number: CFP20W05-POD ISBN:

978-1-7281-7103-6

Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP20W05-POD

 ISBN (Print-On-Demand):
 978-1-7281-7103-6

 ISBN (Online):
 978-1-7281-7102-9

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400

Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



toc

2020 Asia-Pacific International Symposium on Advanced Reliability and Maintenance Modeling (APARM)

Invited Session #3: Degradation analysis and remaining useful life prediction of components in aircraft utility systems

Modeling and Optimization of Comb Electrodes Capacitive Three-Dimensional Force Tactile Sensor	
Jian Tie (Beihang University, China), Shaoping Wang (Beihang University, China), Chao Zhang (Beihang University, China), Jian Shi (Beihang University, China)	1
An Adaptive Control Method for Electro-hydrostatic Actuator Based on Virtual Decomposition Control	
Youhao Shen (Beihang University, China), Xingjian Wang (Beihang University, China), Shaoping Wang (Beihang University, China), Jouni Mattila (Tampere University of Technology, Finland)	7
Fault diagnosis of hydraulic actuator based on improved convolutional neural network	
Liwei Zhao (Beihang University, China), Shaoping Wang (Beihang University, China), Jian Shi (Beihang University, China)	13
A Multi-source Information Fusion Fault Diagnosis Method for Vectoring Nozzle Control System Based on Bayesian Network	
Youyou Zhang (Beihang University, China), Jian Shi (Beihang University, China), Shaoping Wang (Beihang University, China), Zhang Yang (Beihang University, China, China)	19
Methodology for Integrating Conventional and Network Reliability Evaluation Chenq-Hao Huanq (National Chiao Tunq University, Taiwan), Ping-Chen Chang (National Quemoy University, Taiwan), Yi-Kuei Lin (National Chiao Tung University, Taiwan) Reliability Analysis for Multi-state Projects by Decomposition Subsets	25
Yi-Hao Chiu (National Chiao Tung University, Taiwan), Cheng-Fu Huang (Feng Chia University, Taiwan), Yi-Kuei Lin (National Chiao Tung University, Taiwan), Ding-Hsiang Huang (National Chiao Tung University, Taiwan)	30
Lifetime Performance Evaluation and Analysis Model of Passive Component Capacitor Products	
Kuen-Suan Chen (National Chin-Yi University of Technology, Taiwan), Chun-Min Yu (National Chin-Yi University of Technology, Taiwan)	N/A
Regular Session #12: Transfer learning	
Composite Fault Diagnosis Based on Deep Convolutional Generative Adversarial Network	
Yonghong Zhang (Nanjing University of Information Science and Technology, China), Zhongyang Zhang (Nanjing University of Information Science and Technology, China), Fan Shao (Nanjing University of Information Science and Technology, China), Yifei Wang (Nanjing University of Information Science and Technology, China), Xiaoping Zhao (Nanjing University of Information Science & Technology, China), Kaiyang Lv (Nanjing University of Information Science and Technology, China)	40
Adversarial Domain Adaptation for Gear Crack Level Classification Under Variable Load	
Dongdong Wei (University of Alberta, Canada), Te Han (Tsinghua University, China), Fulei Chu (Tsinghua University, China), Ming Jian Zuo (University of Alberta, Canada)	46
Transferable Health Indicator of Rolling Bearings: A New Solution for Cross-Working Condition Monitoring of Degradation Process	
Jiaxian Chen (Henan Normal University, China), Wentao Mao (Henan Normal University, China), Yuejian Chen (University of Alberta, Canada)	52

Regular Session #4: Machine health management

	A Decision-Support Model to Select Forming Principle of Part for Sustainable Manufacturing	
	Wenjin Zhang (University of Electronic Science and Technology of China, China), Peipei Zhang (University of Electronic Science and Technology of China, China), Jiabing Zhang (University of Electronic Science and Technology	
	of China, China)	58
	Risk Assessment of Worn-out Failure of Transport Aircraft based on Monte Carlo Simulation	
	Ziwen Zhang (Nanjing University of Aeronautics and Astronautics, China), Lei Huang (AVIC Helicopter Research and Development Institute, China), Zhong Lu (Nanjing University of Aeronautics and Astronautics, China)	63
	Normal behavior of single-asperity contact of bcc iron: a molecular dynamics simulation study	
	Wenzhen Xie (Tsinghua University, China), Chao Liu (Tsinghua University, China, China), Dongxiang Jiang (Tsinghua University, China)	70
	Research on the layout of spare parts warehouse network based on wind power industry	
	Bin Yan (Southeast University, China), Yifan Zhou (Southeast University, China)	76
Regu	lar Session #9: Random process	
	Mean and Variance of an Alternating Geometric Process	
	Richard Arnold (Victoria University of Wellington, New Zealand), Stefanka Chukova (Victoria University of	
	Wellington, New Zealand, New Zealand), Yu Hayakawa (Waseda University, Japan), Sarah Marshall (Auckland University of Technology, New Zealand)	82
	A Bias-Corrected Kaplan-Meier Estimator	
	Renyan Jiang (Changsha University of Science & Technology, China)	87
	Remaining Useful Life Estimation Based on Wiener Degradation Process With Mixed Random Effects	
	Fengiun Duan (Nanjing University of Finance and Economics, China), Guanjun Wang (Southeast University, China), Wanmeng Wei (Southeast University, China)	93
	Nonparametric Bayesian Analysis of Hazard Rate Functions using the Gamma Process Prior	
	Richard Arnold (Victoria University of Wellington, New Zealand), Stefanka Chukova (Victoria University of	
	Wellington, New Zealand, New Zealand), Yu Hayakawa (Waseda University, Japan)	99
	ed Session #1: Advanced reliability and safety management niques in rail transits A Sparse FP-VAR Model for Representing Multichannel Non-Stationary Baseline Vibration Signals from a Gearbox Yuejian Chen (University of Alberta, Canada), Qinq Li (University of Alberta, Canada, Australia), Dongdong Wei (University of Alberta, Canada), Ming Jian Zuo (University of Alberta, Canada)	105
	An Optimal Band-pass Filter based on Adaptive Identification of Bearing Resonant Frequency Band	
	Wei Guo (University of Electronic Science and Technology of China, China)	111
	Fault Feature Extraction based on Cyclic Correntropy for Train Axle Bearings in Impulsive Noise	
	Xuejun Zhao (Beijing Jiaotong University, China), Yong Qin (State Key Laboratory of Rail Traffic Control and Safety, China), Limin Jia (State Key Laboratory of Rail Traffic Control and Safety, China), Zhiliang Liu (University of Electronic Science and Technology of China, China)	118
	An Intelligence Fault Diagnosis Approach for Rolling Bearings Based on Non-local Convolutional Neural Network	110
	Haoran Han (University of Electronic Science and Technology, China), Huan Wang (University of Electronic Science and Technology of China, China), Zhiliang Liu (University of Electronic Science and Technology of China, China),	123
	Yijia Hao (University of Electronic Science and Technology of China, China)	173
	Multi-Scale CNN based on Attention Machanism for Polling Paging Egult Diagnosis	123
	Multi-Scale CNN based on Attention Mechanism for Rolling Bearing Fault Diagnosis Viiia Hao (University of Electronic Science and Technology of China), Huan Wang (University of Electronic	123
	Yijia Hao (University of Electronic Science and Technology of China, China), Huan Wang (University of Electronic Science and Technology of China, China), Zhiliang Liu (University of Electronic Science and Technology of China,	
	Yijia Hao (University of Electronic Science and Technology of China, China), Huan Wang (University of Electronic	128
	Yijia Hao (University of Electronic Science and Technology of China, China), Huan Wang (University of Electronic Science and Technology of China, China), Zhiliang Liu (University of Electronic Science and Technology of China, China), Haoran Han (University of Electronic Science and Technology, China)	
	Yijia Hao (University of Electronic Science and Technology of China, China), Huan Wang (University of Electronic Science and Technology of China, China), Zhiliang Liu (University of Electronic Science and Technology of China, China), Haoran Han (University of Electronic Science and Technology, China) Vibration Features of High-speed Train Gearbox Induced by Bearing Fault	

Invited Session #5: Dynamic reliability analysis of complex structural and mechanical systems

	The simulation and dynamic reliability estimation of multiple-crack system	
	Shan Jiang (Tsinghua University, China), Yan-Fu Li (Tsinghua University, China)	139
	Dynamic Modeling of a Planetary Gearbox with Sun Gear Crack and Bearing Clearance	
	Xianhua Chen (University of Alberta, Canada), Xingkai Yang (University of Alberta, Canada), Ming Jian Zuo (University of Alberta, Canada), Zhigang (Will) Tian (University of Alberta, Canada)	145
	A Novel Nonlinear Analysis Tool: Multi-scale Symbolic Sample Entropy and Its Application in Condition Monitoring of Rotary Machinery	
	Shun Wang (Northwestern Polytechnical University, China), Yongbo Li (Northwestern Polytechnical University, China)	151
	Analysis and Evaluation of Dynamic Reliability for Mechanical Structures Considering Mixed Uncertain Parameters	
	Xuequang Yu (Shanghai University of Engineering Science, China), Xintian Liu (Shanghai University of Engineering Science, China, China), Jiachi Tong (Shanghai University of Engineering Science, China), Xu Wang (Shanghai	156
	University of Engineering Science, China), Xiaolan Wang (Shanghai University of Engineering Science, China)	156
	Lin Guo (Northwestern Polytechnical University, China), Xiaodong Wang (Northwestern Polytechnical University, China), Zhuqing Wang (Northwestern Polytechnical University, China), Shuang Zhang (Northwestern Polytechnical University & Xi'an Institute of Optics and Precision Mechanics Chinese Academy of Sciences, China), Yangming	
	Guo (College of Computer Science & Northwestern Polytechnical University, China)	162
	Time-dependent Reliability Analysis of a Nonrepairable Multifunctional System Containing Multifunctional Components	
	Jiangbin Zhao (Northwestern Polytechnical University, China), Shubin Si (Northwestern Polytechnical University, China), Zhiqiang Cai (Northwestern Polytechnical University, China), Haitao Liao (University of Arkansas, USA)	169
	Exponential Superimposed Renewal Processes Watalu Yamamoto (The University of Electro-Communications, Japan)	175
	Threshold Type Maintenance Policies for Systems Under Cumulative Damage From Random Shocks	
	Jin Lu (University of Electro-Communications, Japan), Shoma Matoba (University of Electro-Communications,	
	Japan)	179
	Japan)Statistical Analysis and Correlation Study of Tool Wear in NC Machining	179
	Japan)	179
	Japan) Statistical Analysis and Correlation Study of Tool Wear in NC Machining Jiabing Zhang (University of Electronic Science and Technology of China, China), Peipei Zhang (University of Electronic Science and Technology of China, China), Yue Zhou (Xi'an Jiaotong University, China), Wenjin Zhang (University of Electronic Science and Technology of China, China) Statistical Inference for Lifetime Delayed Degradation Process with Gamma Process	
	Japan) Statistical Analysis and Correlation Study of Tool Wear in NC Machining Jiabing Zhang (University of Electronic Science and Technology of China, China), Peipei Zhang (University of Electronic Science and Technology of China, China), Yue Zhou (Xi'an Jiaotong University, China), Wenjin Zhang (University of Electronic Science and Technology of China, China)	184
	Japan) Statistical Analysis and Correlation Study of Tool Wear in NC Machining Jiabing Zhang (University of Electronic Science and Technology of China, China), Peipei Zhang (University of Electronic Science and Technology of China, China), Yue Zhou (Xi'an Jiaotong University, China), Wenjin Zhang (University of Electronic Science and Technology of China, China) Statistical Inference for Lifetime Delayed Degradation Process with Gamma Process Zan Li (Chinese Academy of Sciences, China, USA), Qinqpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China) Wiener processes with random initial degradation values for step-stress accelerated degradation tests data	184
	Japan) Statistical Analysis and Correlation Study of Tool Wear in NC Machining Jiabing Zhang (University of Electronic Science and Technology of China, China), Peipei Zhang (University of Electronic Science and Technology of China, China), Yue Zhou (Xi'an Jiaotong University, China), Wenjin Zhang (University of Electronic Science and Technology of China, China) Statistical Inference for Lifetime Delayed Degradation Process with Gamma Process Zan Li (Chinese Academy of Sciences, China, USA), Qingpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China) Wiener processes with random initial degradation values for step-stress accelerated degradation tests data Chengiie Wang (Academy of Mathematics and Systems Science & Chinese Academy of Sciences, China), Qingpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China)	184 189
	Japan) Statistical Analysis and Correlation Study of Tool Wear in NC Machining Jiabing Zhang (University of Electronic Science and Technology of China, China), Peipei Zhang (University of Electronic Science and Technology of China, China), Yue Zhou (Xi'an Jiaotong University, China), Wenjin Zhang (University of Electronic Science and Technology of China, China) Statistical Inference for Lifetime Delayed Degradation Process with Gamma Process Zan Li (Chinese Academy of Sciences, China, USA), Qinqpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China) Wiener processes with random initial degradation values for step-stress accelerated degradation tests data Chengiie Wang (Academy of Mathematics and Systems Science & Chinese Academy of Sciences, China), Qingpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China) Asset life assessment by utilizing Weibull analysis with application on tank bottom components	184 189 194
	Japan) Statistical Analysis and Correlation Study of Tool Wear in NC Machining Jiabing Zhang (University of Electronic Science and Technology of China, China), Peipei Zhang (University of Electronic Science and Technology of China, China), Yue Zhou (Xi'an Jiaotong University, China), Wenjin Zhang (University of Electronic Science and Technology of China, China) Statistical Inference for Lifetime Delayed Degradation Process with Gamma Process Zan Li (Chinese Academy of Sciences, China, USA), Qingpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China) Wiener processes with random initial degradation values for step-stress accelerated degradation tests data Chengiie Wang (Academy of Mathematics and Systems Science & Chinese Academy of Sciences, China), Qingpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China)	184 189 194
Regu	Japan) Statistical Analysis and Correlation Study of Tool Wear in NC Machining Jiabing Zhang (University of Electronic Science and Technology of China, China), Peipei Zhang (University of Electronic Science and Technology of China, China), Yue Zhou (Xi'an Jiaotong University, China), Wenjin Zhang (University of Electronic Science and Technology of China, China) Statistical Inference for Lifetime Delayed Degradation Process with Gamma Process Zan Li (Chinese Academy of Sciences, China, USA), Qinqpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China) Wiener processes with random initial degradation values for step-stress accelerated degradation tests data Chengiie Wang (Academy of Mathematics and Systems Science & Chinese Academy of Sciences, China), Qingpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China) Asset life assessment by utilizing Weibull analysis with application on tank bottom components	184 189 194
Regu	Japan) Statistical Analysis and Correlation Study of Tool Wear in NC Machining Jiabing Zhang (University of Electronic Science and Technology of China, China), Peipei Zhang (University of Electronic Science and Technology of China, China), Yue Zhou (Xi'an Jiaotong University, China), Wenjin Zhang (University of Electronic Science and Technology of China, China) Statistical Inference for Lifetime Delayed Degradation Process with Gamma Process Zan Li (Chinese Academy of Sciences, China, USA), Qinqpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China) Wiener processes with random initial degradation values for step-stress accelerated degradation tests data Chenqiie Wang (Academy of Mathematics and Systems Science & Chinese Academy of Sciences, China), Qingpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China) Asset life assessment by utilizing Weibull analysis with application on tank bottom components Saif Eldin Mohamed Youssef (GAS Arabian Services, Saudi Arabia)	184 189 194
Regu	Statistical Analysis and Correlation Study of Tool Wear in NC Machining Jiabing Zhang (University of Electronic Science and Technology of China, China), Peipei Zhang (University of Electronic Science and Technology of China, China), Yue Zhou (Xi'an Jiaotong University, China), Wenjin Zhang (University of Electronic Science and Technology of China, China) Statistical Inference for Lifetime Delayed Degradation Process with Gamma Process Zan Li (Chinese Academy of Sciences, China, USA), Qinqpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China) Wiener processes with random initial degradation values for step-stress accelerated degradation tests data Chenqiie Wang (Academy of Mathematics and Systems Science & Chinese Academy of Sciences, China), Qingpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China) Asset life assessment by utilizing Weibull analysis with application on tank bottom components Saif Eldin Mohamed Youssef (GAS Arabian Services, Saudi Arabia)	184 189 194 199
Regu	Japan) Statistical Analysis and Correlation Study of Tool Wear in NC Machining Jiabing Zhang (University of Electronic Science and Technology of China, China), Peipei Zhang (University of Electronic Science and Technology of China, China) Jiaotong University, China), Wenjin Zhang (University of Electronic Science and Technology of China, China) Statistical Inference for Lifetime Delayed Degradation Process with Gamma Process Zan Li (Chinese Academy of Sciences, China, USA), Qinqpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China) Wiener processes with random initial degradation values for step-stress accelerated degradation tests data Chengiie Wang (Academy of Mathematics and Systems Science & Chinese Academy of Sciences, China), Qingpei Hu (Chinese Academy of Sciences, China), Dan Yu (Academy of Mathematics and Systems Science, China) Asset life assessment by utilizing Weibull analysis with application on tank bottom components Saif Eldin Mohamed Youssef (GAS Arabian Services, Saudi Arabia) A Segmented CRC-Aided PSS-SS-SCL Algorithm for Polar Codes Jianping Li (Communication University of China, China), Huanhuan Liu (Communication University of China, China)	184 189 194 199

	Developing a Variables Modified Chain Sampling Plan with Taguchi Capability Index	
	Zih-Huei Wang (Feng Chia University, Taiwan), Chien-Wei Wu (National Tsing Hua University, Taiwan), Wei-Ren Lin (Feng Chia University, Taiwan)	215
	A Creep Model For Pressure Sensitive Adhesives Under Shear Load	
	Abhishek Deshpande (University of Maryland, USA), Zhichao Song (Google Inc, USA), Swanand Vaidya (GOOGLE LLC, USA)	219
	On the Coverage Probability of Bias-Corrected Confidence Bounds	
	Tamer Tevetoglu (University of Stuttgart, Germany), Bernd Bertsche (Institute of Machine Components - University of Stuttgart, Germany)	224
	Machine learning approaches in reliability and maintenance	
	Shaomin Wu (Room 308, Kent Business School & University of Kent, United Kingdom (Great Britain)), Di Wu (School of Management, Xi'an Jiaotong University, China, USA), Rui Peng (Beijing University of Technology, China)	230
Regu	ular Session #7: Nonstationary signal processing	
	Normalization of Gearbox Vibration Signal for Tracking Tooth Crack Severity Progression Under Time-Varying Operating Conditions	
	Xingkai Yang (University of Alberta, Canada), Ming Jian Zuo (University of Alberta, Canada), Zhigang (Will) Tian (University of Alberta, Canada)	235
	Varying Speed Bearing Fault Diagnosis Based on Synchroextracting Transform and Deep Residual Network	
	Tian Ran Lin (Qingdao University of Technology, China), Jie Shang (Qingdao University of Technology, China)	241
	A Fault Classification Method for Rotor under Fluctuating Condition based on COTHS-CNN Changije Yue (University of Electronic Science and Technology of China(UESTC), China), KeSheng Wang (University	
	of Electronic Science and Technology of China, China)	246
	Matching time-frequency enhancement and its application to bearing fault diagnosis under time-varying speed conditions	
	Zehui Hua (Soochow University, China), Juanjuan Shi (Soochow University, China), Xingxing Jiang (Soochow University, China), Zhongkui Zhu (Soochow University, China)	252
	Fault Diagnosis of Planetary Gearbox under Nonstationary Conditions Based on the Velocity Synchronous Chirplet Transform	
	Yunpeng Guan (University of Science & Technology Beijing, China), Zhipeng Feng (University of Science and Technology Beijing, China)	258
	Synchrosqueezing transform based general linear chirplet transform of instantaneous rotational frequency estimation	
	for rotating machines with speed variations Yi Liu (Guilin University of Electronic Technology, China), Zhansi Jiang (Guilin University of Electronic Technology,	
	China), Gang Wang (Wenzhou University, China), Jiawei Xiang (Wenzhou University, China)	264
	ed Session #10: Reliability modelling and optimal configuration plex systems	on o
	Imperfect Maintenance Scheduling for High Pressure Feedwater Heater System in Nuclear Power Plant Mengyu Du (Tsinghua University, China), Chen Zhang (Tsinghua University, China), Taotao Zhou (Tsinghua University, China)	200
	University, China), Yan-Fu Li (Tsinghua University, China)	269
	Taotao Zhou (Tsinghua University, China), Yan-Fu Li (Tsinghua University, China)	275
	Prediction of Software Fault Detection and Correction Processes with Time Series Analysis	
	Rui Peng (Beijing University of Technology, China), Yingchun Li (Beijing University of Technology, China), Kaiye Gao (Beijing Information Science and Technology, China), Ye Ma (Beijing University of Technology, China)	279
	Cascading Failures of Overload Behaviors on Interdependent Networks	
	Ziyang Jin (Chang'an University, China), Ning Wang (Chang'an University, China), Jiao Zhao (Chang'an University, China)	285
	Modelling of Inspection Cycles for Power Distribution Transformers	_55
	Sathishkumar Nachimuthu (University of Alberta, Canada), Ming Jian Zuo (University of Alberta, Canada), Stephen	
	Seewald (EPCOR Distribution and Transmission Inc., Canada), Jebb Richard (EPCOR Distribution and Transmission Inc., Canada), Connor Thicke (EPCOR Distribution and Transmission Inc., Canada)	290

(China Electronic Product Reliability and Environmental Testing Research Institute & CEPREI Industrial Design Center for Quality and Reliability of Indutrial Product, China), Yong Pan (CEPREI, China), Yujie Liu (CEPREI, China), Zhe Lai (CEPREI, China)	295
Regular Session #1: Advanced machine learning techniques	
Aero-engine Life Limit Parts Replacement Policy Optimization: Reinforcement Learning Method	
Lin (Harbin Institute of Technology, China), Jie Liu (Harbin Institute of Technology, China), Jinshan Liu (China Aerospace Science and Technology Corporation, China), Shisheng Zhong (Harbin Institute of Technology, China) Feng Guo (Harbin Institute of Technology, China)	302
A comparison study on the different SNR levels to the accuracy of two deep learning techniques in fault diagnosis of planetary gearbox	
Ruiyuan Wang (University of Electronic Science and Technology of China, China), KeSheng Wang (University of Electronic Science and Technology of China, China)	308
A Novel Anomaly Detection Method for Gas Turbines Using Weight Agnostic Neural Network Search	
Shisheng Zhong (Harbin Institute of Technology, China), Dan Liu (Harbin Institute of Technology, China), Lin Lin (Harbin Institute of Technology, China), Minghang Zhao (Harbin Institute of Technology at Weihai, China), Xuyun Fu (Harbin Institute of Technology at Weihai, China), Feng Guo (Harbin Institute of Technology, China)	314
Bearing Fault Diagnosis Based on Extreme Machine Learning Optimized by Differential Evolution	
Yongtao Hu (Henan Institute of Technology, China), Jinfeng Gao (Zhengzhou University, China), Qiang Zhou (Henan Weihua Heavy Machinery Co., Ltd, China), Xiaoyu Chen (Henan Institute of Technology, China)	320
A two-stage algorithm of railway sleeper crack detection based on edge detection and CNN	
Gang Wang (Wenzhou University, China), Yi Liu (Guilin University of Electronic Technology, China), Jiawei Xiang (Wenzhou University, China)	326
Unsupervised Fault Diagnosis of Machine via Multiple-Order Graphical Deep Extreme Learning Machine	
Xiaoli Zhao (the University of British Columbia, Canada), Zheng Liu (University of British Columbia Okanagan,	
Canada), Teng Wang (the University of British Columbia, Canada), Junchi Bin (University of British Columbia, Okanagan, Canada), Minping Jia (Southeast University, China)	33:
Canada), Tenq Wanq (the University of British Columbia, Canada), Junchi Bin (University of British Columbia, Okanagan, Canada), Minping Jia (Southeast University, China) Regular Session #10: Rotating machinery diagnostics Use of Autoregressive Conditional Heteroskedasticity Model to Assess Gear Tooth Surface Roughness Yuejian Chen (University of Alberta, Canada), Ke Feng (University of New South Wales, Australia), Robert Randall	
Canada), Teng Wang (the University of British Columbia, Canada), Junchi Bin (University of British Columbia, Okanagan, Canada), Minping Jia (Southeast University, China) Regular Session #10: Rotating machinery diagnostics Use of Autoregressive Conditional Heteroskedasticity Model to Assess Gear Tooth Surface Roughness)
Canada), Teng Wang (the University of British Columbia, Canada), Junchi Bin (University of British Columbia, Okanagan, Canada), Minping Jia (Southeast University, China) Regular Session #10: Rotating machinery diagnostics Use of Autoregressive Conditional Heteroskedasticity Model to Assess Gear Tooth Surface Roughness Yuejian Chen (University of Alberta, Canada), Ke Feng (University of New South Wales, Australia), Robert Randall (University of South Wales, Australia), Pietro Borghesani (University of New South Wales, Australia), Ming Jian Zu (University of Alberta, Canada) Hierarchical Graph Model Based Approach for Change Detection in Bearing Degradation Process)
Canada), Tenq Wanq (the University of British Columbia, Canada), Junchi Bin (University of British Columbia, Okanagan, Canada), Minping Jia (Southeast University, China) Regular Session #10: Rotating machinery diagnostics Use of Autoregressive Conditional Heteroskedasticity Model to Assess Gear Tooth Surface Roughness Yuejian Chen (University of Alberta, Canada), Ke Fenq (University of New South Wales, Australia), Robert Randall (University of South Wales, Australia), Pietro Borghesani (University of New South Wales, Australia), Ming Jian Zu (University of Alberta, Canada) Hierarchical Graph Model Based Approach for Change Detection in Bearing Degradation Process Shaohua Yang (Shandong University, China), Zhenjie Zhu (Shandong University, China), Guoliang LU (Shandong University, China)	o 337
Canada), Tenq Wanq (the University of British Columbia, Canada), Junchi Bin (University of British Columbia, Okanagan, Canada), Minping Jia (Southeast University, China) Regular Session #10: Rotating machinery diagnostics Use of Autoregressive Conditional Heteroskedasticity Model to Assess Gear Tooth Surface Roughness Yuejian Chen (University of Alberta, Canada), Ke Fenq (University of New South Wales, Australia), Robert Randall (University of South Wales, Australia), Pietro Borghesani (University of New South Wales, Australia), Ming Jian Zu (University of Alberta, Canada) Hierarchical Graph Model Based Approach for Change Detection in Bearing Degradation Process Shaohua Yanq (Shandong University, China), Zhenjie Zhu (Shandong University, China), Guoliang LU (Shandong University, China) Study on A Special Category of FM Signals with Applications to Planetary Gearbox Fault Diagnosis Under Non-stationary Conditions) 337
Canada), Tenq Wanq (the University of British Columbia, Canada), Junchi Bin (University of British Columbia, Okanagan, Canada), Minping Jia (Southeast University, China) Regular Session #10: Rotating machinery diagnostics Use of Autoregressive Conditional Heteroskedasticity Model to Assess Gear Tooth Surface Roughness Yuejian Chen (University of Alberta, Canada), Ke Fenq (University of New South Wales, Australia), Robert Randall (University of South Wales, Australia), Pietro Borghesani (University of New South Wales, Australia), Ming Jian Zu (University of Alberta, Canada) Hierarchical Graph Model Based Approach for Change Detection in Bearing Degradation Process Shaohua Yanq (Shandong University, China), Zhenjie Zhu (Shandong University, China), Guoliang LU (Shandong University, China) Study on A Special Category of FM Signals with Applications to Planetary Gearbox Fault Diagnosis Under Nonstationary Conditions Penq Zhou (Shanghai Jiao Tong University, China), Zhike Penq (Shanghai Jiaotong University, China), Zhigang (Wana Cuniversity of Alberta, Canada), Ming Jian Zuo (University of Alberta, Canada)	337 341
Canada), Tenq Wanq (the University of British Columbia, Canada), Junchi Bin (University of British Columbia, Okanagan, Canada), Minping Jia (Southeast University, China) Regular Session #10: Rotating machinery diagnostics Use of Autoregressive Conditional Heteroskedasticity Model to Assess Gear Tooth Surface Roughness Yuejian Chen (University of Alberta, Canada), Ke Fenq (University of New South Wales, Australia), Robert Randall (University of South Wales, Australia), Pietro Borghesani (University of New South Wales, Australia), Ming Jian Zu (University of Alberta, Canada) Hierarchical Graph Model Based Approach for Change Detection in Bearing Degradation Process Shaohua Yanq (Shandong University, China), Zhenjie Zhu (Shandong University, China), Guoliang LU (Shandong University, China) Study on A Special Category of FM Signals with Applications to Planetary Gearbox Fault Diagnosis Under Nonstationary Conditions Penq Zhou (Shanghai Jiao Tong University, China), Zhike Penq (Shanghai Jiaotong University, China), Zhigang (Wallong Conditions) Penq Zhou (Shanghai Jiao Tong University, China), Zhike Penq (Shanghai Jiaotong University, China), Zhigang (Wallong Conditions) Penq Zhou (Shanghai Jiao Tong University, China), Zhike Penq (Shanghai Jiaotong University, China), Zhigang (Wallong Conditions) Penq Zhou (Shanghai Jiao Tong University, China), Zhike Penq (Shanghai Jiaotong University, China), Zhigang (Wallong Conditions)	337 341 346
Canada), Tenq Wanq (the University of British Columbia, Canada), Junchi Bin (University of British Columbia, Okanagan, Canada), Minping Jia (Southeast University, China) Regular Session #10: Rotating machinery diagnostics Use of Autoregressive Conditional Heteroskedasticity Model to Assess Gear Tooth Surface Roughness Yuejian Chen (University of Alberta, Canada), Ke Fenq (University of New South Wales, Australia), Robert Randall (University of South Wales, Australia), Pietro Borghesani (University of New South Wales, Australia), Ming Jian Zu (University of Alberta, Canada) Hierarchical Graph Model Based Approach for Change Detection in Bearing Degradation Process Shaohua Yanq (Shandong University, China), Zhenjie Zhu (Shandong University, China), Guoliang LU (Shandong University, China) Study on A Special Category of FM Signals with Applications to Planetary Gearbox Fault Diagnosis Under Nonstationary Conditions Penq Zhou (Shanqhai Jiao Tonq University, China), Zhike Penq (Shanqhai Jiaotonq University, China), Zhigang (Wallong Chongaling Of Spur Gear with Spalling Fault Considering Manufacture Pitch Error Qiuyuan Chen (Chonqqinq University, China), Liminq Wanq (Chonqqinq University, China), Yimin Shao (Chongqing University, China), Xiaoxi Ding (Chongqing University, China), Guorong Long (Chongqing University, China)	337 341 346 g
Canada), Tenq Wanq (the University of British Columbia, Canada), Junchi Bin (University of British Columbia, Okanagan, Canada), Minping Jia (Southeast University, China) Regular Session #10: Rotating machinery diagnostics Use of Autoregressive Conditional Heteroskedasticity Model to Assess Gear Tooth Surface Roughness Yuejian Chen (University of Alberta, Canada), Ke Fenq (University of New South Wales, Australia), Robert Randall (University of South Wales, Australia), Pietro Borghesani (University of New South Wales, Australia), Ming Jian Zu (University of Alberta, Canada) Hierarchical Graph Model Based Approach for Change Detection in Bearing Degradation Process Shaohua Yanq (Shandong University, China), Zhenjie Zhu (Shandong University, China), Guoliang LU (Shandong University, China) Study on A Special Category of FM Signals with Applications to Planetary Gearbox Fault Diagnosis Under Nonstationary Conditions Penq Zhou (Shanqhai Jiao Tonq University, China), Zhike Penq (Shanqhai Jiaotonq University, China), Zhigang (Wallong Chongaing Of Spur Gear with Spalling Fault Considering Manufacture Pitch Error Qiuyuan Chen (Chonqainq University, China), Liminq Wanq (Chonqainq University, China), Yimin Shao (Chongqir University, China), Xiaoxi Ding (Chongqing University, China), Guorong Long (Chongqing University, China) Vibration method	337 341 (III) 346 g
Canada), Tenq Wanq (the University of British Columbia, Canada), Junchi Bin (University of British Columbia, Okanagan, Canada), Minping Jia (Southeast University, China) Regular Session #10: Rotating machinery diagnostics Use of Autoregressive Conditional Heteroskedasticity Model to Assess Gear Tooth Surface Roughness Yuejian Chen (University of Alberta, Canada), Ke Fenq (University of New South Wales, Australia), Robert Randall (University of South Wales, Australia), Pietro Borghesani (University of New South Wales, Australia), Ming Jian Zu (University of Alberta, Canada) Hierarchical Graph Model Based Approach for Change Detection in Bearing Degradation Process Shaohua Yanq (Shandong University, China), Zhenjie Zhu (Shandong University, China), Guoliang LU (Shandong University, China) Study on A Special Category of FM Signals with Applications to Planetary Gearbox Fault Diagnosis Under Nonstationary Conditions Penq Zhou (Shanqhai Jiao Tonq University, China), Zhike Penq (Shanqhai Jiaotonq University, China), Zhigang (Walian (University of Alberta, Canada) Dynamic Modeling of Spur Gear with Spalling Fault Considering Manufacture Pitch Error Qiuyuan Chen (Chonqqinq University, China), Liminq Wanq (Chonqqinq University, China), Yimin Shao (Chonqqing University, China), Xiaoxi Ding (Chongqing University, China), Guorong Long (Chongqing University, China) Vibration mechanism of gear system with angular misalignment error based on an improved meshing stiffness calculation method Guoronq Long (Chonqqinq University, China), Liminq Wanq (Chonqqing University, China), Yimin Shao (Chonqqing University, China), Qiuyuan Chen (Chonqqinq University, China), Liminq Wanq (Chonqqing University, China), Yimin Shao (Chonqqing University, China), Qiuyuan Chen (Chonqqing University, China), Liminq Wanq (Chonqqing University, China), Yimin Shao (Chonqqing University, China), Qiuyuan Chen (Chonqqing University, China), Liminq Wanq (Chonqqing University, China), Yimin Shao (Chonqqing University, China)	337
Canada), Tenq Wanq (the University of British Columbia, Canada), Junchi Bin (University of British Columbia, Okanagan, Canada), Minping Jia (Southeast University, China) Regular Session #10: Rotating machinery diagnostics Use of Autoregressive Conditional Heteroskedasticity Model to Assess Gear Tooth Surface Roughness Yuejian Chen (University of Alberta, Canada), Ke Fenq (University of New South Wales, Australia), Robert Randall (University of South Wales, Australia), Pietro Borghesani (University of New South Wales, Australia), Ming Jian Zu (University of Alberta, Canada) Hierarchical Graph Model Based Approach for Change Detection in Bearing Degradation Process Shaohua Yanq (Shandong University, China), Zhenjie Zhu (Shandong University, China), Guoliang LU (Shandong University, China) Study on A Special Category of FM Signals with Applications to Planetary Gearbox Fault Diagnosis Under Non-stationary Conditions Penq Zhou (Shanqhai Jiao Tonq University, China), Zhike Penq (Shanqhai Jiaotonq University, China), Zhigang (W Tian (University of Alberta, Canada), Ming Jian Zuo (University of Alberta, Canada) Dynamic Modeling of Spur Gear with Spalling Fault Considering Manufacture Pitch Error Qiuyuan Chen (Chonqqinq University, China), Liminq Wanq (Chonqqinq University, China), Yimin Shao (Chongqin University, China), Xiaoxi Ding (Chongqing University, China), Guorong Long (Chongqing University, China) Vibration methad Guorong Long (Chonqqinq University, China), Liminq Wang (Chongqing University, China), Yimin Shao (Chongqing University, China), Liminq Wang (Chongqing University, China), Yimin Shao (Chongqing University, China), Liminq Wang (Chongqing University, China), Yimin Shao (Chongqing University, China), Liminq Wang (Chongqing University, China), Yimin Shao (Chongqing University, China), Liminq Wang (Chongqing University, China), Yimin Shao (Chongqing University, China), Liminq Wang (Chongqing University, China), Yimin Shao (Chongqing University, China), Liminq Wang (Chongqing University, China), Yim	337 341 (III) 346 g

Research on the Technology to Build Safety Integration Model of Complex System Based on Relevant Failure

Nie Guojian (Electronic Product Reliability and Environmental Testing Research Institute, China), Honggi Yang

Regular Session #2: Asset reliability analysis

Reliability assessment of corroded pipeline considering multiple defects interaction based on an artificial neural netwo. method	rK
Han Zhang (University of Alberta, Canada), Zhigang (Will) Tian (University of Alberta, Canada)	370
Lindley Type Distributions and Software Reliability Assessment	
Qi Xiao (Hiroshima University, Japan), Tadashi Dohi (Hiroshima University, Japan), Hiroyuki Okamura (Hiroshima University, Japan)	376
Reliability Analysis of Manufacturing Machine with Degradation and Low-quality Feedstocks	
Zhenggeng Ye (Northwestern Polytechnical University, China), Zhiqiang Cai (Northwestern Polytechnical Universit China), Hui Yang (Pennsylvania State University, USA)	
Reliability Analysis of Position Accuracy of Welding Robot	
Wenxue Qian (Northeastern University, China), Shuai Song (Northeastern University, China), Changhui Yao (Northeastern University, China), Xiaowei Yin (Shenyang Institute of Engineering, China)	387
Reliability Analysis of Vacuum Circuit Breakers with Multiple Failure Modes	202
Will C Wascom (Texas Tech University & NASA Ames, USA), Yisha Xiang (Texas Tech University, USA)	392
Regular Session #3: Degradation analysis	
Quantitative Method of Health State Assessment Inside the Safe Region	
Yuhua Yin (University of Electronic Science and Technology of China, China), Zhiliang Liu (University of Electronic Science and Technology of China, China), Zhe Cheng (National University of Defense Technology, China)	398
A Review of State-of-health Estimation of Lithium-ion Batteries: Experiments and Data Ruomei Zhou (Sun Yat-sen University, China), Shasha Fu (Sun Yat-sen University, China), Weiwen Peng (Sun Yat-se	20
University, China)	
A Particle-Filter-Based Online Method for Degradation Analysis with Exponential-Dispersion Process	
Ricong Huang (Sun Yat-sen University, China), Weiwen Peng (Sun Yat-sen University, China)	410
Bayesian-based Method for the Remaining useful life and reliability prediction of steel structure	
Teng Wang (the University of British Columbia, Canada), Zheng Liu (University of British Columbia Okanagan, Canada), Xiaoli Zhao (the University of British Columbia, Canada), Min Liao (National Research Council Canada, Canada), Nezih Mrad (NRC, USA)	416
Life prediction for the tractor of an elevator based on the sliding displacement	
Yimin Wei (Zhejiang Sci-Tech University, China), Jun Pan (Teacher, China), Tong Li (Zhejiang Sci-Tech University, China), Meide Wang (Zhejiang Sci-Tech University, China), Bin Feng (Hangzhou Youmai Tech Co Ltd, China),	422
Yonglei Dai (Zhejiang Academy of Special Equipment Science, China)	422
Panel: Autonomous Vehicles	
Panel on Safety, Security, and Reliability of Autonomous Vehicles	
W. Eric Wong (University of Texas, Dallas, USA), Yue Chen (Futurewei Technologies, USA), Dennis Kengo Oka	
(Synopsys, Japan), Martin J Soukup (Irdeto, Canada), German Ros (Intel Labs, USA), Min Xie (City University of Hor Kong, Hong Kong), Zijiang Yang (Western Michigan University, USA), Mohammad Zulkernine (Queen's University, Canada), Ming Jian Zuo (University of Alberta, Canada)	
Canada), Willig Hall 2do (Oniversity of Alberta, Canada)	427
Invited Session #12.1: System reliability and maintenance mode	ling
Joint optimization of maintenance and production scheduling for unrelated parallel-machine system	
Mageed Ghaleb (Ryerson University, Canada), Sharareh Taghipour (Ryerson University, Canada), Hossein Zolfagharinia (Ryerson University, Canada)	430
Variance of Reliability Estimate for K-Out-Of-N System with Cold Standby Units	150
Tongdan Jin (Texas State University, USA), Jose Espiritu (The University of Texas at El Paso, USA), Heidi Taboada (The University of Texas at El Paso, USA)	436
Maintenance Decision Making using State Dependent Markov Analysis with Failure Couplings	
Xinyang Liu (University of Illinois at Urbana Champaign, USA), Pingfeng Wang (University of Illinois at Urbana Champaign, USA)	442

Optimal Maintenance Policies for degrading hydrocarbon pipelines using Markov Decision Process Yisha Xianq (Texas Tech University, USA), Eric Bediako (Texas Tech University, USA), Suzan Alaswad (Zayed University, United Arab Emirates), Zhigang (Will) Tian (University of Alberta, Canada)	. 448
Invited Session #8.1: New models and approaches for the reliability	&
quality	
Periodic and Sequential Inspection Policies with Mission Failure Probabilities Xufeng Zhao (Nanjing University of Aeronautics and Astronautics, China), Xujie Jia (Minzu University of China,	
China), Mingchih Chen (Fu Jen Catholic University, Taiwan), Cunhua Qian (Nanjing Tech University, China), Toshio Nakagawa (Aichi Institute of Technology, Japan)	. 452
A Study on Evaluation of Stability in Process Mean Using Bayesian Updating Yasuhiko Takemoto (KINDAI University, Japan), Ikuo Arizono (Okayama University, Japan)	458
Invited Session #9.1: Reliability data analysis and decision making	
Maintenance of a System with Increasing Energy Consumption Rate	
Di Wu (School of Management, Xi'an Jiaotong University, China), Rui Peng (Beijing University of Technology, China), Ye Ma (Beijing University of Technology, China), Li Yang (University of Toronto, Canada)	. 463
Reliability of dynamic k-out-of-n systems with coupling components in power transmission systems	403
Heping Jia (North China Electric Power University, China), Yi Ding (Zhejiang University, China), Liudong Xing (University of Massachusetts, USA), Dunnan Liu (North China Electric Power University, China)	467
A New Compound Negative Binomial Distribution and Its Applications in Reliability	
Xiaoyue Wang (Beijing Technology and Business University, China), Xian Zhao (Beijing Institute of Technology, China), Jinglei Sun (Beijing Institute of Technology, China)	473
Regular Session #11.1: Maintenance strategy	
An Alternative Maintenance Policy for Protection Systems Subject to Shocks Due to Demands	
Alexandre Ramalho Alberti (Universidade Federal de Pernambuco & RANDOM, INCT-INSID, Brazil), Cristiano Alexandre Virgínio Cavalcante (Universidade Federal de Pernambuco & RANDOM, INCT-INSID, Brazil)	479
Assessment of Maintenance Effectiveness for Repairable Systems: PM and CM Case Studies	
Syamsundar Annamraju (Visakhapatnam Steel Plant, India), V. N. Achutha Naikan (Indian Institute of Technology, Kharagpur, India)	484
Expected Maintenance Actions for Imperfect Production Processes Using a Markovian Approach	
Wael I. Al Hajailan (University of Illinois at Chicago, USA), David He (University of Illinois at Chicago, USA)	489
Optimal Post-Warranty Maintenance Strategy For The Second-Hand Product Jak-Hak Lim (Hanbat National University, Korea (South)), Dae Kyung Kim (Chonbuk National University, Korea	
(South)), Dong Ho Park (Hallym University, Korea (South))	495
Regular Session #5.1: Fundamental reliability analysis theory	
A sample truncation rule for product reliability estimation with multiple censoring data	
Liyanq Xie (Northeastern University, China), Jiaxin Song (Northeastern University, China), Ningxiang Wu (Northeastern University, China)	E01
Reliability analysis for competing failure processes with mutual dependence of system under the cumulative shock	JUI
Lina Bian (Southeast University, China), Guanjun Wang (Southeast University, China)	505
Reliability evaluation based on historical batch information	
Wenda Kang (Beijing Institute of Technology, China), Houbao Xu (Beijing Institute of Technology, China), Huiling Zheng (Beijing Institute of Technology, China)	510

Invited Session #12.2: System reliability and maintenance modeling

Optimal Maintenance Strategy for Second-Hand Product Considering Preventive Maintenance Actions Minjae Park (Hongik University, Korea (South)), Ki Mun Jung (Kyungsung University, Korea (South)), Dong Ho Park (Hallym University, Korea (South))	516
Maintenance Optimization of Multi-State Systems with Single Maintenance Capacity and Arbitrarily Distributed Maintenance Time	310
Yiming Chen (University of Electronic Science and Technology of China, China), Tao Jiang (University of Electronic Science and Technology of China, China), Yu Liu (University of Electronic Science and Technology of China, China) ————————————————————————————————————	522 527
Invited Session #9.2: New models and approaches for the reliability	h., Q.
Invited Session #8.2: New models and approaches for the reliabilit quality	.y
Optimization Problems for Consecutive-k-out-of-n:G Systems with Exchangeable Components	
Lei Zhou (Tokyo Metropolitan University, Japan), Hisashi Yamamoto (Tokyo Metropolitan University, Japan), Xiao Xiao (Tokyo Metropolitan University, Japan)	534
Factor copula modeling of coherent systems with dependent components	
Shuhei Ota (Kanagawa University, Japan), Mitsuhiro Kimura (Hosei University, Japan)	540
Satoshi Mizutani (Aichi Institute of Technology, Japan), Xufenq Zhao (Nanjing University of Aeronautics and Astronautics, China), Toshio Nakagawa (Aichi Institute of Technology, Japan)	545
Bi-objective Optimization of Network Reliability by Genetic Algorithm	
Natsumi Takahashi (National Defense Academy, Japan), Tomoaki Akiba (Chiba Institute of Technology & Faculty of Social Sysetms Science, Japan), Hisashi Yamamoto (Tokyo Metropolitan University, Japan), Shao-Chin Sung (Aoyama Gakuin University, Japan)	550
Invited Session #9.2: Reliability data analysis and decision making A Knowledge Synthesis Method for Weibull Distribution Estimation with Four Right-Censored Life Data Liyang Xie (Northeastern University, China), Jungang Ren (Northeastern University, China), Jiaxin Song (Northeastern University, China), Ningxiang Wu (Northeastern University, China)	554
Reliability of a Star Configuration Power Grid System with Performance Sharing	334
Peng Su (Southeast University, China), Guanjun Wang (Southeast University, China)	558
Bayesian Based Data Analysis Method for Reliability Prediction of Electronics Zheng Lixiang (Electronic Product Reliability and Environmental Testing Research Institute, China), Yu Di (Electronic Product Reliability and Environmental Testing Research Institute, China), Nie Guojian (Electronic Product Reliability and Environmental Testing Research Institute, China), Yang Yun (Electronic Product Reliability and Environmental Testing Research Institute, China), Lei Ting (Electronic Product Reliability and Environmental Testing Research	
Institute, China), Liu Yuke (Electronic Product Reliability and Environmental Testing Research Institute, China)	564
Regular Session #11.2: Maintenance strategy	
Structure of an optimal maintenance policy for a Semi-Markovian deteriorating system with major and minor failures Nobuyuki Tamura (Hosei University, Japan)	569
Preventive maintenance optimization for large-scale systems under life cycle cost	
Ruiqi Wang (University of Electronic Science and Technology of China, China), Guangyu Chen (University of Electronic Science and Technology of China, China), Na Liang (University of Electronic Science and Technology of China, China)	573
Predictive maintenance framework of the aircraft system based on PHM information	5
Hongsheng Yan (Nanjing University of Aeronautics and Astronautics, China), Hongfu Zuo (Nanjing University of Aeronautics and Astronautics, China), Jiangi Tang (Xiamen Airlines, China), Ronghui Wang (Xiamen Airlines, China), Xiaojun Ma (Science and Technology Commission COMAC, China)	579

	Adaptiva annuli annuli annul antara de fara antara arii alciitta annul air	
	Adaptive sampling with neural networks for system reliability analysis Ning-cong Xiao (University of Electronic Science and Technology of China, China), Hongyou Zhan (University of Electronic Science and Technology of China, China), Kai Yuan (University of Electronic Science and Technology of China, China)	59
	Belief Reliability Evaluation with Limited Time-to-Failure Data under Uncertain Right Censoring Wenbin Chen (School of Reliability and Systems Engineering, Beihang University & Science and Technology on Reliability and Environmental Engineering Laboratory, China), Xiaoyang Li (School of Reliability and Systems Engineering, Beihang University, China), Fangrong Li (School of Reliability and Systems Engineering, Beihang University, China), Rui Kang (BUAA, China)	59
	An effective Kriging-based Approach for System Reliability Analysis with Multiple Failure Modes Chengning Zhou (University of Electronic Science and Technology of China, China), Ning-cong Xiao (University of Electronic Science and Technology of China, China), Ming Jian Zuo (University of Alberta, Canada), Wei Gao (University of New South Wales, Australia), Qing Li (University of Electronic Science and Technology of China, China)	60
Invite	ed Session #11: Reliability tests and data analysis	
	Planning Accelerated Destructive Degradation Test with Block Effects Jiaxiang Cai (National University of Singapore, Singapore), Zhisheng YE (National University of Singapore, Singapore)	60
	A Differential Burn-in Policy Considering Nonhomogeneous Distribution of Spatial Defects in Semiconductor Manufacturing	
	Yuan Tao (Ohio Univ, USA), Yuan Chen (Ohio University, USA), Yue Kuo (Texas A&M University, USA) A Bayesian Model Averaging Method for Software Reliability Assessment	61
	Qiumin Yu (University of Electronic Science and Technology of China, China), Steven Li (Western New England University, USA)	61
	Qiumin Yu (University of Electronic Science and Technology of China, China), Steven Li (Western New England University, USA) ed Session #2: Decision support systems for improving the cruction and maintenance of wind farm projects Simulation-based approach for risk assessment in onshore wind farm construction projects Emad Mohamed (University of Alberta, Canada), Nima Gerami Seresht (University of Alberta, Canada), Stephen Hague (University of Alberta, Canada), Simaan AbouRizk (University of Alberta, Canada) Wind Turbine Power Output Estimation with Probabilistic Power Curves	
	Qiumin Yu (University of Electronic Science and Technology of China, China), Steven Li (Western New England University, USA) ed Session #2: Decision support systems for improving the cruction and maintenance of wind farm projects Simulation-based approach for risk assessment in onshore wind farm construction projects Emad Mohamed (University of Alberta, Canada), Nima Gerami Seresht (University of Alberta, Canada), Stephen Hague (University of Alberta, Canada), Simaan AbouRizk (University of Alberta, Canada)	62
const	Qiumin Yu (University of Electronic Science and Technology of China, China), Steven Li (Western New England University, USA) ed Session #2: Decision support systems for improving the cruction and maintenance of wind farm projects Simulation-based approach for risk assessment in onshore wind farm construction projects Emad Mohamed (University of Alberta, Canada), Nima Gerami Seresht (University of Alberta, Canada), Stephen Hague (University of Alberta, Canada), Simaan AbouRizk (University of Alberta, Canada) Wind Turbine Power Output Estimation with Probabilistic Power Curves Siyun Ge (University of Alberta, Canada), Ming Jian Zuo (University of Alberta, Canada), Zhigang (Will) Tian (University of Alberta, Canada) A PdM framework Through the Event-based Genomics of Machine Breakdown Morad Danishvar (Brunel University, United Kingdom (Great Britain)), Alireza Mousavi (Brunel University, United	61 62 63 63
const	Qiumin Yu (University of Electronic Science and Technology of China, China), Steven Li (Western New England University, USA) ed Session #2: Decision support systems for improving the cruction and maintenance of wind farm projects Simulation-based approach for risk assessment in onshore wind farm construction projects Emad Mohamed (University of Alberta, Canada), Nima Gerami Seresht (University of Alberta, Canada), Stephen Hague (University of Alberta, Canada), Simaan AbouRizk (University of Alberta, Canada) Wind Turbine Power Output Estimation with Probabilistic Power Curves Siyun Ge (University of Alberta, Canada), Ming Jian Zuo (University of Alberta, Canada), Zhigang (Will) Tian (University of Alberta, Canada) A PdM framework Through the Event-based Genomics of Machine Breakdown Morad Danishvar (Brunel University, United Kingdom (Great Britain)), Alireza Mousavi (Brunel University, United Kingdom (Great Britain)), Veerendra C. Angadi (Brunel University London, United Kingdom (Great Britain))	62 63

Maintenance task scheduling of wind turbine based on task priority

Jia Wang (Hebei University of Technology, China), Luyu Zhang (Hebei University of Technology, China), Guanghan	
Bai (National University of Defense Technology, China)	652
Planning of an Accelerated Degradation Test under Different Constraints of Operating Conditions I-Chen Lee (National Cheng Kung University, Taiwan), Zi-Yu Lin (National Cheng Kung University, Taiwan)	657
1-Cheff Lee (National Cheffy Kung Oniversity, Taiwan), 21-10 Lin (National Cheffy Kung Oniversity, Taiwan)	037
Regular Session #13: Stability analysis	
A Note on Uncertainty Propagation for Availability Model of Mobile Cloud Computing Systems	
Junjun Zheng (Ritsumeikan University, Japan), Jiahao Zhang (Hiroshima University, Japan), Hiroyuki Okamura	
(Hiroshima University, Japan), Tadashi Dohi (Hiroshima University, Japan)	662
Stability Analysis of Wireless Powered Communication Networks	
Mingfu Li (Chang Gung University, Taiwan), Ching-Chieh Fang (Chang Gung Unicersity, Taiwan), Huei-Wen Ferng (National Taiwan University of Science and Technology, Taiwan)	670
Structural Robustness-based SHM Point Arrangement Strategy for In-service Cable-stayed Bridge Subjected to Cable Damage Effect	
Qiwen Jin (Henan University of Technology, China), Zheng Liu (University of British Columbia Okanagan, Canada)	676
Effects of flow rate and silt particle on vibration of a double-suction centrifugal pump	
Zhiyuan Wang (Wuhan University, China), Zhongdong Qian (Wuhan University, China)	682
Regular Session #8: Optimization Electric Bus Charging Station's Location and Capacity Based on Routes and Grid AP Clustering Algorithm	
Fan Yanhong (Shanghai Fengxian Power Supply Company, National Grid Company, China), He Chunhui (Shanghai Fengxian Power Supply Company, National Grid Company, China), Fei Danxiong (Shanghai Fengxian Power Supply Company, National Grid Company, China), Gu Jiu (Shanghai Jiaotong University, China), Da Xie (Shanghai Jiao Tong University, China)	690
Fengxian Power Supply Company, National Grid Company, China), Fei Danxiong (Shanghai Fengxian Power Supply Company, National Grid Company, China), Gu Jiu (Shanghai Jiaotong University, China), Da Xie (Shanghai Jiao Tong	690
Fengxian Power Supply Company, National Grid Company, China), Fei Danxiong (Shanghai Fengxian Power Supply Company, National Grid Company, China), Gu Jiu (Shanghai Jiaotong University, China), Da Xie (Shanghai Jiao Tong University, China)	690 696
Fengxian Power Supply Company, National Grid Company, China), Fei Danxiong (Shanghai Fengxian Power Supply Company, National Grid Company, China), Gu Jiu (Shanghai Jiaotong University, China), Da Xie (Shanghai Jiao Tong University, China) Formulation of Opportunity-Based Age Replacement Models with Markovian Arrival Process Hiroyuki Okamura (Hiroshima University, Japan), Junjun Zheng (Ritsumeikan University, Japan), Tadashi Dohi	
Fengxian Power Supply Company, National Grid Company, China), Fei Danxiong (Shanghai Fengxian Power Supply Company, National Grid Company, China), Gu Jiu (Shanghai Jiaotong University, China), Da Xie (Shanghai Jiao Tong University, China) Formulation of Opportunity-Based Age Replacement Models with Markovian Arrival Process Hiroyuki Okamura (Hiroshima University, Japan), Junjun Zheng (Ritsumeikan University, Japan), Tadashi Dohi (Hiroshima University, Japan) Inventory Control Optimization via Neural-Nets Based Demand Prediction Haoyu Wang (Tianjin University, China), Xiaoyu Fan (Tianjin University, China), Yan Zhang (Tianjin University, China), Xiaoyue Du (Tianjin University, China), Bohan Cui (Tianjin University, China), Yingjun Deng (Tianjin University,	696
Fengxian Power Supply Company, National Grid Company, China), Fei Danxiong (Shanghai Fengxian Power Supply Company, National Grid Company, China), Gu Jiu (Shanghai Jiaotong University, China), Da Xie (Shanghai Jiao Tong University, China) Formulation of Opportunity-Based Age Replacement Models with Markovian Arrival Process Hiroyuki Okamura (Hiroshima University, Japan), Junjun Zheng (Ritsumeikan University, Japan), Tadashi Dohi (Hiroshima University, Japan) Inventory Control Optimization via Neural-Nets Based Demand Prediction Haoyu Wang (Tianjin University, China), Xiaoyu Fan (Tianjin University, China), Yan Zhang (Tianjin University, China), Xiaoyue Du (Tianjin University, China), Bohan Cui (Tianjin University, China), Yingjun Deng (Tianjin University, China)	
Fengxian Power Supply Company, National Grid Company, China), Fei Danxiong (Shanghai Fengxian Power Supply Company, National Grid Company, China), Gu Jiu (Shanghai Jiaotong University, China), Da Xie (Shanghai Jiao Tong University, China) Formulation of Opportunity-Based Age Replacement Models with Markovian Arrival Process Hiroyuki Okamura (Hiroshima University, Japan), Junjun Zheng (Ritsumeikan University, Japan), Tadashi Dohi (Hiroshima University, Japan) Inventory Control Optimization via Neural-Nets Based Demand Prediction Haoyu Wang (Tianjin University, China), Xiaoyu Fan (Tianjin University, China), Yan Zhang (Tianjin University, China), Xiaoyue Du (Tianjin University, China), Bohan Cui (Tianjin University, China), Yingjun Deng (Tianjin University,	696
Fengxian Power Supply Company, National Grid Company, China), Fei Danxiong (Shanghai Fengxian Power Supply Company, National Grid Company, China), Gu Jiu (Shanghai Jiaotong University, China), Da Xie (Shanghai Jiao Tong University, China) Formulation of Opportunity-Based Age Replacement Models with Markovian Arrival Process Hiroyuki Okamura (Hiroshima University, Japan), Junjun Zheng (Ritsumeikan University, Japan), Tadashi Dohi (Hiroshima University, Japan) Inventory Control Optimization via Neural-Nets Based Demand Prediction Haoyu Wang (Tianjin University, China), Xiaoyu Fan (Tianjin University, China), Yan Zhang (Tianjin University, China), Xiaoyue Du (Tianjin University, China), Bohan Cui (Tianjin University, China), Yingjun Deng (Tianjin University, China)	701
Fenqxian Power Supply Company, National Grid Company, China), Fei Danxionq (Shanghai Fenqxian Power Supply Company, National Grid Company, China), Gu Jiu (Shanghai Jiaotong University, China), Da Xie (Shanghai Jiao Tong University, China) Formulation of Opportunity-Based Age Replacement Models with Markovian Arrival Process Hiroyuki Okamura (Hiroshima University, Japan), Junjun Zheng (Ritsumeikan University, Japan), Tadashi Dohi (Hiroshima University, Japan) Inventory Control Optimization via Neural-Nets Based Demand Prediction Haoyu Wang (Tianjin University, China), Xiaoyu Fan (Tianjin University, China), Yan Zhang (Tianjin University, China), Xiaoyue Du (Tianjin University, China), Bohan Cui (Tianjin University, China), Yingjun Deng (Tianjin University, China) Additional Papers Virtual Rotating Speed Meter: Extracting Machinery Rotating Speed from Vibration Signals based on Deep	696
Fengxian Power Supply Company, National Grid Company, China), Fei Danxiong (Shanghai Fengxian Power Supply Company, National Grid Company, China), Gu Jiu (Shanghai Jiaotong University, China), Da Xie (Shanghai Jiao Tong University, China) Formulation of Opportunity-Based Age Replacement Models with Markovian Arrival Process Hiroyuki Okamura (Hiroshima University, Japan), Junjun Zheng (Ritsumeikan University, Japan), Tadashi Dohi (Hiroshima University, Japan) Inventory Control Optimization via Neural-Nets Based Demand Prediction Haoyu Wang (Tianjin University, China), Xiaoyu Fan (Tianjin University, China), Yan Zhang (Tianjin University, China), Xiaoyue Du (Tianjin University, China), Bohan Cui (Tianjin University, China), Yingjun Deng (Tianjin University, China) Additional Papers Virtual Rotating Speed Meter: Extracting Machinery Rotating Speed from Vibration Signals based on Deep Learning and Transfer Learning	696
Fengxian Power Supply Company, National Grid Company, China), Fei Danxionq (Shanghai Fengxian Power Supply Company, National Grid Company, China), Gu Jiu (Shanghai Jiaotong University, China), Da Xie (Shanghai Jiao Tong University, China) Formulation of Opportunity-Based Age Replacement Models with Markovian Arrival Process Hiroyuki Okamura (Hiroshima University, Japan), Junjun Zheng (Ritsumeikan University, Japan), Tadashi Dohi (Hiroshima University, Japan) Inventory Control Optimization via Neural-Nets Based Demand Prediction Haoyu Wang (Tianjin University, China), Xiaoyu Fan (Tianjin University, China), Yan Zhang (Tianjin University, China), Xiaoyue Du (Tianjin University, China), Bohan Cui (Tianjin University, China), Yingjun Deng (Tianjin University, China) Additional Papers Virtual Rotating Speed Meter: Extracting Machinery Rotating Speed from Vibration Signals based on Deep Learning and Transfer Learning Meng Rao, Qing Li, Dongdong Wei, Ming J. Zuo (University of Alberta, Canada)	696