



International Conference on Applied Nonlinear Dynamics, Vibration, and Control (ICANDVC-2024)

Conference Program

Dalian China
Oct.25-27 2024



Contents

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Welcome Message

Interdisciplinary research and development are the general trend in nowadays science and technology progress involving synthetic efforts of researchers and engineers from various backgrounds. ICANDVC is such an academic platform with an enthusiastic aim to provide a high-quality academic exchange of the most recent advances in the areas related to nonlinear dynamics, vibration analysis and control, energy harvesting, structural health monitoring, control systems theory and methods, robotics, and their engineering applications. The conference will reflect the state of the art of applied nonlinear dynamics and control in academic and engineering practice and is an opportunity to exchange scientific, technical and experimental ideas in a multi-disciplinary and inter-disciplinary circumstance. Active and leading scholars in these related areas from EU, US, and Asia will be invited for keynote speeches and focused research topics, which are keen on R&D frontiers in the areas.

Following successful organization of the ICANDVC in Zhuhai (2021), Online forum (2022) and Hong Kong (2023), ICANDVC-2024 will be held in Dalian city, China during 25-27 Oct. 2024. acting as a continuation of this international academic forum for pursuing innovation and impact of science and technology development in related disciplines.

On behalf of the Conference Organizing Committee, we are pleased to welcome you to Dalian for the ICANDVC-2024. We wish to express our appreciation and thanks to all the individuals who have contributed to ICANDVC-2024 in a variety of ways. Our sincere thanks should firstly go to distinguished keynote speakers and all the authors for contributing their updated research work, and to the participants in making the ICANDVC-2024 a great event. Special thanks are given to our colleagues and contributed authors for their thoughtful reviews of all submissions. Last but not least, we would extend our thanks to all members in the Organizing Committee and our volunteer students for their dedicated efforts in organizing the conference. Thank you and wish you a great conference experience and enjoyable stay in Dalian.

Conference Chairs

Xingjian Jing, City University of Hong Kong

Dixiong Yang, Dalian University of Technology

Hu Ding, Shanghai University

Jiqiang Wang, Ningbo Institute of Materials Technology & Engineering, CAS





Organization of ICANDVC-2024

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Jiqiang Wang, Ningbo Institute of Materials Technology & Engineering, CAS

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Yongqiang Liu, Shijiazhuang Tiedao University
Zhangjun Liu, Wuhan Institute of Technology
Zeqi Lu, Shanghai University
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Zhong Luo, Northeastern University
Bingyu Ni, Hunan University
Donghong Ning, Ocean University of China
Huihui Pan, Harbin Institute of Technology
Haijun Peng, Dalian University of Technology
Zhaoye Qin, Tsinghua University
Wenai Shen, Huazhong University of Science and Technology
Ning Sun, Nankai University
Shuaishuai Sun, University of Science and Technology of China
Wei Sun, Liaocheng University
Weichao Sun, Harbin Institute of Technology
Yougang Sun, Tongji University



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Siji Wang, Northwestern Polytechnical University
Xin Wang, Institute of Automation, Qilu University of Technology
Yilong Wang, Harbin Institute of Technology
Yu Wang, Harbin Engineering University
Shurui Wen, Harbin Engineering University
Marian Wiercigroch, University of Aberdeen
Feng Wu, Dalian University of Technology
Shunan Wu, Sun Yat-sen University
Yinan Wu, Nankai University
Ying Wu, Xi'an Jiaotong University
Zhigang Wu, Sun Yat-sen University
Zhijing Wu, Harbin Engineering University
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Yuan Yao, Southwest Jiaotong University
Ping Yi, Dalian University of Technology
Dianlong Yu, National University of Defense Technology
Liang Yu, Northwestern Polytechnical University
Haicheng Zhang, Hunan University
Menghua Zhang, University of Jinan
Jinhua Zhang, Guangzhou University
Jing Zhao, University of Macau
Jiaxi Zhou, Hunan University
Shengxi Zhou, Northwestern Polytechnical University

Conference Secretary

Hui Li (Registration & Hotels), Dalian University of Technology
Zhenzeng Lei (Submission & Accept Letters), Dalian University of Technology
Guohai Chen (General enquiry), Dalian University of Technology

Program Overview

25 October 2024 Friday

| | | |
|-------------|---------------|---|
| 13:00-22:00 | Registration | The Lobby of Kempinski Hotel |
| 18:00-20:00 | Buffet Dinner | Coffee Berlin Restaurant (Second Floor) |

26 October 2024 Saturday

| | | |
|-------------|-------------------|--|
| 08:30-09:00 | Opening Ceremony | Grand Ballroom (Third Floor) |
| 09:00-09:40 | Plenary Keynote 1 | Grand Ballroom (Third Floor) |
| 09:40-10:10 | Break | |
| 10:10-10:50 | Plenary Keynote 2 | Grand Ballroom (Third Floor) |
| 10:50-11:30 | Plenary Keynote 3 | Grand Ballroom (Third Floor) |
| 11:30-13:00 | Buffet Lunch | Coffee Berlin Restaurant (Second Floor) |
| 14:00-18:00 | Parallel Sessions | Grand Ballroom, Berlin Hall, Budapest Hall (Third Floor) |
| 18:30-20:30 | Dinner | Grand Ballroom (Third Floor) |

27 October 2024 Sunday

| | | |
|-------------|-------------------|--|
| 08:30-12:15 | Parallel Sessions | Grand Ballroom, Berlin Hall, Budapest Hall (Third Floor) |
| 12:30-13:30 | Buffet Lunch | Coffee Berlin Restaurant (Second Floor) |
| 14:00-14:40 | Plenary Keynote 4 | Grand Ballroom (Third Floor) |
| 14:40-15:20 | Plenary Keynote 5 | Grand Ballroom (Third Floor) |
| 15:20-15:40 | Break | |
| 15:40-16:20 | Plenary Keynote 6 | Grand Ballroom (Third Floor) |
| 16:20-17:00 | Plenary Keynote 7 | Grand Ballroom (Third Floor) |
| 17:00-17:10 | Closing Ceremony | Grand Ballroom (Third Floor) |
| 17:30-19:30 | Buffet Dinner | Coffee Berlin Restaurant (Second Floor) |

Plenary Keynotes

Xu Guo, Professor
Dalian University of Technology



Topic: AI-enabled large-scale structural optimization

Time: 09:00-09:40, 26 October 2024 (Grand Ballroom)

Abstract: Structural analysis for structures composed of highly heterogeneous materials which often involves the solution of large-scale linear algebraic equations is very time-consuming even within the linear elastic regime. Furthermore, the tremendous computational cost of iterative large-scale finite element analysis also prevents the widespread use of topology optimization as a powerful design tool especially when the desired design resolution is very high. In order to break the bottleneck hindering the efficient solutions of large-scale structural analysis and design optimization problems, a general machine learning (ML) enhanced substructure-based framework is proposed. The essential idea is resorting to the classical substructure-based finite element analysis approach and establishing an implicit mapping between the parameters characterizing the material distribution within a substructure and the corresponding condensed stiffness matrix/ numerical shape functions through offline trained deep neural networks. In contrast to most of the existing ML enhanced approaches, the proposed framework is truly problem independent machine learning (PIML), i.e., which is independent of the forms of structural geometry, boundary condition and external load, and can be applied to solve various boundary value problems governing by the same type of partial differential equation once the offline training is completed. Compared with the traditional paradigm, it can achieve 10³-10⁴ times solution efficiency for tested large-scale examples with satisfactory accuracy. The effectiveness of the approach was also validated for the non-adjoint topology optimization problems, i.e., 3D compliant mechanism design. Finally, to demonstrate the proposed approach's capability in dealing with extremely large-scale three-dimensional problems, a full-parallel framework based on PIML approach is developed. A cantilever beam example over 100 billion degrees of freedom is optimized in 200 iterations with an average time of only 42.0 seconds per step.

Biography: Xu Guo, academician of the Chinese Academy of Sciences, a recipient of the National Natural Science Fund for Distinguished Young Scholars, and Chang Jiang Distinguished Professorship, is now a professor at Dalian University of Technology and holds the deputy director of the State Key Laboratory of Structural Analysis, Optimization and CAE Software for Industrial Equipment. Prof. Guo has long been devoted to research on computational mechanics, structural optimization, and solid mechanics, as well as the development of autonomous and controllable CAE optimization software, and has made significant contributions in these fields. He won two second-class awards of the National Natural Science Prize, two first-class awards of the Natural Science Prize for the Chinese Ministry of Education. He is also a vice president of the Chinese Society of Mechanics, vice president of the International Society of Structural and Multidisciplinary Optimization (ISSMO), associate editor of the Journal of Mechanical Design-Transactions of the ASME, review editor of Structural and Multidisciplinary Optimization, editorial board member of Computer Methods in Applied Mechanics and Engineering, International Journal for Numerical Methods in Engineering, etc.

Plenary Keynotes

Marian Wiercigroch
University of Aberdeen



Topic: Nonlinear dynamics of machining processes

Time: 10:10-10:50, 26 October 2024 (Grand Ballroom)

Abstract: Comprehensive understanding of chatter, bifurcations and stability is essential for improving productivity, quality, and efficiency of manufacturing operations. Chatter manifests itself as undesired large amplitude self-excited vibration, whilst bifurcation and stability analysis hold the keys to its effective control and suppression. Bifurcations in manufacturing occur when processing and system parameters cross certain values and(or) they are results of complex interactions resulting predominantly in creating or disappearance of limit cycles. Bifurcations in manufacturing processes belong to the most complex ones, where nonlinearities are very strong and play the dominant role. Process stability is vital to ensure high-quality surface finish, dimensional accuracy, and extended machine and tool life. In this lecture, first I will define nonlinearity, chatter, bifurcations and stability in manufacturing processes with the focus on metal cutting. Then I will discuss on the frictional chatter, which was introduced and investigated with my group and collaborators. Chatter in precision grinding has been a subject of many of our investigations, where low dimensional strongly nonlinear models were used to undertake in depth analytical and numerical studies. Finally, examples of advanced nonlinear dynamics techniques such as path following bifurcation analysis, basins of attraction, Poincare maps and Lyapunov exponents will be discussed, which have been used to examine stability and determine a practically important measure so-called cutting safety.

Biography: Professor Marian Wiercigroch holds a prestigious Sixth Century Chair in Applied Dynamics and he is a founding director of the Centre for Applied Dynamics Research at the University of Aberdeen. His area of research is theoretical and experimental nonlinear dynamics. Wiercigroch has published extensively (over 500 journal and conference papers) and sits on a dozen editorial boards of peer review journals. He is a frequent keynote and plenary speaker at major international conferences and the Editor-In-Chief of International Journal of Mechanical Sciences. He is the inventor of new patented drilling technology called Resonance Enhanced Drilling and the Founder and Chief Technology Officer of a spinoff company iVDynamics Ltd. He has established in Aberdeen unique experimental laboratories. Marian is a Scottish Champion of Knowledge Exchange (2020) and he served as a panelist in the Research Excellence Framework (2014, 2021). He has received many awards and distinctions including a Senior Fulbright Scholarship (1994), Fellowship of the Royal Society of Edinburgh (2009), DSc honoris causa from the Lodz University of Technology (2013), Distinguished Honorary Professorships from the Perm National Research Polytechnic University (2017), Balseiro Institute (2018), Yanshan University (2021) and University of Nottingham Ningbo (2023).

Plenary Keynotes

Weixin Ren
Shenzhen University

Topic: A physics-data hybrid framework to develop bridge digital twin model in structural health monitoring

Time: 10:50-11:30, 26 October 2024 (Grand Ballroom)



Abstract: Digital twin in structural health monitoring aims to create a virtual model for a physical structure by combining measurement data. The most important feature is to achieve the physical structure-monitoring data synchronization. For this purpose, a physics-data hybrid framework to develop the bridge digital twin model in structural health monitoring is presented. The physical base is firstly formed by the finite element model of the digital representation for the physical bridge that can fully incorporate with both structural geometry and structural state. The data base is then built by all measurement data of the monitored bridge. By defining the context that is common to both physical base and data base, the mirror relationship between physical base and data base for the specified context is formulated. To achieve the best matching of the mirror relationship by minimizing process, the digital twin model in term of the specified context can be developed. In such away, the proposed framework integrates physical knowledge and data intelligence into one model. A demonstration of a simulated simply supported beam is provided to show how the digital twin model is developed by using proposed physics-data hybrid framework. The presented physics-data hybrid framework is help of clearer understanding of the realization of digital twin model in structural health monitoring, providing a new perspective for smart bridge solutions.

Biography: Dr. Wei-Xin Ren, foreign member of the Russian Academy of Engineering, is currently chair professor in the college of civil and transportation engineering at Shenzhen University, China. He received his PhD in bridge engineering from Central South University in 1993 and has been a full professor since 1995. His research interests include nonlinear system identification, structural health monitoring, damage detection and model updating. Prof. Ren has authored over 400 academic papers including more than 230 referred international journal papers. Prof. Ren currently serves as Associate Editor of Mechanical System and Signal Processing, Editorial Board Member for Engineering Structures and Deputy Director of National Key Laboratory of Green and Long-Life Road Engineering in Extreme Environment.

Plenary Keynotes

Duc Truong Pham

University of Birmingham

Topic: The mechanics of product disassembly for remanufacturing

Time: 14:00-14:40, 27 October 2024 (Grand Ballroom)



Abstract: Remanufacturing is the process of returning a used product to at least the same condition as the original product. Remanufacturing saves resources (raw materials, energy, water, etc.), reduces greenhouse gas emissions and avoids the need for landfill space. Remanufacturing is part of a circular economy. Disassembly is the first operation in remanufacturing. It is labour-intensive and very difficult to automate. The aim of our research is to develop mathematical and computer models of ‘atomic’ disassembly processes such as removing a shaft from a clearance hole, separating press-fitted components and undoing a nut or a bolt. The work forms part of a research programme to investigate disassembly science and derive a fundamental understanding of the mechanics and informatics involved in disassembly. Our hypothesis is that such an understanding would enable the engineering of reliable and efficient disassembly automation equipment. This presentation will start with a discussion of remanufacturing to set the scene for our disassembly research. It will subsequently focus on the results of our investigations into the mechanics of fundamental disassembly tasks to inform how they can best be performed by machines and what tools should be designed to facilitate the automatic performance of those tasks.

Biography: Prof. Pham, OBE, FEng, FLSW, BE, PhD, DEng, CEng, FIET, FIMechE, SFHEA, holds the Chance Chair of Engineering at the University of Birmingham. His research covers intelligent systems, robotics and autonomous systems and advanced manufacturing and remanufacturing technology. He has published over 600 technical papers and books and has graduated more than 100 PhD students. He has received several awards including five prizes from the Institution of Mechanical Engineers, a Lifetime Achievement Award from the World Automation Congress and a Distinguished International Academic Contribution Award from the IEEE. He is a Fellow of the Royal Academy of Engineering, Learned Society of Wales, Society for Manufacturing Engineers, Institution of Engineering and Technology and Institution of Mechanical Engineers. He is the founding editor of the Springer Series in Advanced Manufacturing and editor-in-chief of Cogent Engineering and the International Journal on Interactive Design and Manufacturing.

Plenary Keynotes

Albert C. J. Luo
Southern Illinois University Edwardsville

Topic: Dynamics and bifurcations of product-quadratic nonlinear systems

Time: 14:40-15:20, 27 October 2024 (Grand Ballroom)



Abstract: This talk is about nonlinear dynamics and bifurcations of the quadratic dynamical systems. Such a two-dimensional dynamical system is one of simplest dynamical systems in nonlinear dynamics, but the local and global structures of equilibriums and flows in such two-dimensional quadratic systems help us understand other nonlinear dynamical systems, which is also a crucial step toward solving the Hilbert's sixteenth problem. Possible singular dynamics of the two-dimensional quadratic systems are discussed in detail. The dynamics of equilibriums and one-dimensional flows in two-dimensional systems are presented. Saddle-sink and saddle-source bifurcations are discussed, and saddle-center bifurcations are presented. The infinite-equilibrium states are switching bifurcations for nonlinear systems. From the first integral manifolds, the saddle-center networks are developed, and the networks of saddles, source, and sink are also presented.

Biography: Albert C.J. Luo a distinguished research professor at Southern Illinois University Edwardsville. His research interests include: Hilbert 16th problem, discontinuous nonlinear dynamical systems, periodic flows to chaos in time-delayed nonlinear systems, bifurcation trees of periodic flows to chaos in nonlinear systems, synchronization of dynamical systems, discontinuous dynamical system theory, stochastic and resonant layer theory in nonlinear dynamic systems, nonlinear theories for deformable-body dynamics etc. He proposed various new theories and methods, and achieved many new breakthroughs. Professor Luo has published 50 monographs and over 470 journal and conference papers. He organized over 30 international symposiums and conferences on Dynamics and Control. He is also a fellow of ASME and member of editorial boards for several international academic journals.

Plenary Keynotes

Hector Jensen

Santa Maria Technical University

Topic: Multi-Objective reliability-based design optimization of structural dynamical systems under stochastic excitation

Time: 15:40-16:20, 27 October 2024 (Grand Ballroom)



Abstract: Reliability-based multi-objective optimization formulations give valuable insight for the design of structural dynamical systems under stochastic excitation. Nonetheless, since reliability assessment is often conducted using simulation techniques, the generation of the entire Pareto front or compromise solutions may lead to excessive or even prohibitive computational costs. In this lecture, an approach for exploring specific tradeoff solutions is discussed. To this end, a compromise programming problem is formulated using a weighted Chebyshev metric based on aspiration levels. The formulation leads to a min-max optimization problem which is solved by means of a two-phase stochastic search technique that sequentially explores the corresponding feasible and optimum solution sets. A number of nearly equivalent tradeoff designs are obtained at the end of the solution process, which provide insight and flexibility for decision-making purposes. For improved numerical efficiency, an adaptive surrogate model for reliability measures is implemented. A number of examples are presented to assess the capabilities of the proposed method and to illustrate the effectiveness and usefulness of the optimization approach. The proposed framework encompasses several advantageous features for practical implementation. For example, it allows exploring specific tradeoff solutions even in non-convex Pareto fronts, it gives information about the interaction between the objective functions within the feasible set which can be employed to assist decision-making processes, and it is well suited to handle problems involving multiple nearly optimal and disjoint regions. Overall, the proposed framework constitutes a potentially useful tool to support decision-making processes in a practical class of structural design problems, including general structural dynamical systems under stochastic excitation.

Biography: Hector Jensen is a Professor Civil Engineering at the Santa Maria Technical University, Valparaiso, Chile, and Professor of Mechanical Engineering at the Catholic University of Chile, Santiago, Chile. His research interests include Computational Stochastic Mechanics, Advanced Simulation Methods, Robust and Reliability-Based Optimization, Risk and Sensitivity Analysis. He has been visiting professor in several American and European universities, including University of California at Los Angeles, California Institute of Technology, University of Michigan, University of Innsbruck, etc. He is member of the editorial board of several journals, and he has been guest editor of different Journals, including Computers and Structures and Mechanical Systems and Signal Processing. In 2018 he was selected by the Recruitment Program of High-end Foreign Experts of the State Administration of Foreign Affairs of the People's Republic of China.

Plenary Keynotes

Haiping Du

University of Wollongong

Topic: Advancing vehicle comfort and safety with electrically interconnected suspension systems

Time: 16:20-17:00, 27 October 2024 (Grand Ballroom)



Abstract: Vehicle suspension systems play a crucial role in mitigating vibrations and enhancing ride comfort for passengers and drivers. However, traditional independent suspension designs often struggle to optimise stiffness and damping characteristics independently across various vibration modes, leading to compromises in ride comfort and stability. In response, electrically interconnected suspension systems have emerged as a promising technology to address these challenges. In this keynote, we provide an overview of our research on electrically interconnected suspension systems and associated technologies. We discuss the limitations of conventional suspension systems and explore the principles and technical features of electrically interconnected systems, focusing on the electrical network and decoupling control characteristics. We highlight the concept of synchronous decoupling control for multiple vibration modes, discuss control algorithms, and present performance verification results. Our research findings, derived from recent publications, demonstrate the potential of electrically interconnected suspension systems for real-world implementation. With their rapid responsiveness, affordability, and effectiveness, these systems offer promising advancements in vehicle comfort and safety.

Biography: Prof. Du received the PhD degree in mechanical design and theory from Shanghai Jiao Tong University, Shanghai, China, in 2002. Since 2016, he has served as a Senior Professor at the School of Electrical, Computer and Telecommunications Engineering at the University of Wollongong, Australia. Prior to his current position, Prof. Du held various research roles, including Research Fellow at the University of Technology, Sydney, and Postdoctoral Research Associate positions at Imperial College London and the University of Hong Kong. Prof. Du is a Subject Editor of the Journal of Franklin Institute, an Associate Editor of IEEE Transactions on Industrial Electronics, IEEE Transactions on Intelligent Vehicles, and IEEE Control Systems Society Conference. He also serves on the editorial boards of several international journals, including the Journal of Sound and Vibration, IMechE Journal of Systems and Control Engineering, and Journal of Low Frequency Noise, Vibration and Active Control. With research interests spanning vibration control, vehicle dynamics and control systems, robust control theory, electric vehicles, robotics and automation, and smart materials and structures, Prof. Du is at the forefront of interdisciplinary research aimed at advancing engineering applications and addressing real-world challenges.

Invited Sessions

| Session Topics | Session Chairs |
|--|--|
| IS01: Nonlinear vibration suppression and energy harvesting | Shengxi Zhou, Northwestern Polytechnical University Tao Yang, Northwestern Polytechnical University Huliang Dai, Huazhong University of Science and Technology Zeqi Lu, Shanghai University Yilong Wang, Harbin Institute of Technology |
| IS02: Discontinuous/non-smooth dynamical systems and control of nonlinear systems | Albert Luo, Southern Illinois University Edwardsville Ling Hong, Xi'an Jiaotong University Jianzhe Huang, Shanghai Jiao Tong University |
| IS03: Nonlinear dynamics of rotating machines and applications | Lei Hou, Harbin Institute of Technology Zhaoye Qin, Tsinghua University Siji Wang, Northwestern Polytechnical University Quankun Li, Northwestern Polytechnical University Xi Chen, Southern University of Science and Technology |
| IS04: Stochastic dynamics and statistical application of nonlinear systems | Wei Li, Xidian University Dongmei Huang, Xidian University Liang Wang, Northwestern Polytechnical University Wantao Jia, Northwestern Polytechnical University Guidong Yang, Xidian University |
| IS05: Exploring nonlinear benefits in energy harvesting and vibration control | Meng Li, Southwest Jiaotong University Yuyang Chai, Harbin Engineering University Jing Bian, Chongqing University Guoqing Jiang, Zhejiang Sci-Tech University Fengming Li, Harbin Engineering University Yinghui Li, Southwest Jiaotong University |
| IS06: Random vibration and uncertainty quantification | Dixiong Yang, Dalian University of Technology Zhangjun Liu, Wuhan Institute of Technology Hongzhe Dai, Harbin Institute of Technology Jianhua Yang, China University of Mining and Technology Ping Yi, Dalian University of Technology Guohai Chen, Dalian University of Technology |

Invited Sessions

| Session Topics | Session Chairs |
|---|---|
| <p>IS07: Decision-making and motion control for intelligent unmanned autonomous systems</p> | <p>Yanbin Liu, Harbin Institute of Technology Xin Wang, Institute of Automation, Qilu Univ. of Technology Jue Wang, Ningbo Intelligent Equip. Research Institute Co. LTD Jinhua Zhang, Guangzhou University Huihui Pan, Harbin Institute of Technology Weichao Sun, Harbin Institute of Technology</p> |
| <p>IS08: Robust control for mechanical systems</p> | <p>Ning Sun, Nankai University Menghua Zhang, University of Jinan Jing Zhao, University of Macau He Chen, Hebei University of Technology Yinan Wu, Nankai University</p> |
| <p>IS09: Nonlinear control for underactuated mechanical systems</p> | <p>Yingbo Huang, Kunming University of Science and Technology Donghong Ning, Ocean University of China Yougang Sun, Tongji University Shengquan Li, Yangzhou University Wei Sun, Liaocheng University Zixin Huang, Wuhan Institute of Technology</p> |
| <p>IS10: Structural nonlinear dynamics, vibration/acoustic control and applications</p> | <p>Zhijing Wu, Harbin Engineering University Shurui Wen, Harbin Engineering University Yu Wang, Harbin Engineering University Zhiguang Song, Harbin Engineering University Fengming Li, Harbin Engineering University</p> |
| <p>IS11: Nonlinear vibration reduction and dynamic design</p> | <p>Bo Yan, Zhejiang Sci-Tech University Jiayi Zhou, Hunan University</p> |
| <p>IS12: Noise and vibration measurement, signal processing and control for transportation equipment</p> | <p>Dianlong Yu, National University of Defense Technology Y. S. Choy, Hong Kong Polytechnic University Liang Yu, Northwestern Polytechnical University Xiaoang Liu, Hebei University of Technology Long Chen, Northwestern Polytechnical University</p> |
| <p>IS13: Spacecraft dynamics and control</p> | <p>Haijun Peng, Dalian University of Technology Shujun Tan, Dalian University of Technology Shunan Wu, Sun Yat-sen University Zhigang Wu, Sun Yat-sen University</p> |



Invited Sessions

| Session Topics | Session Chairs |
|---|---|
| <p>IS14: Data-driven modeling and identification of nonlinear systems</p> | <p>Junyi Cao, Xi'an Jiaotong University Zhong Luo, Northeastern University Lin Du, Northwestern Polytechnical University Changming Cheng, Shanghai Jiao Tong University</p> |
| <p>IS15: Nonlinear dynamics and vibration control in marine engineering</p> | <p>Yu Wang, Harbin Engineering University Haicheng Zhang, Hunan University Marian Wiercigroch, University of Aberdeen Fengming Li, Harbin Engineering University</p> |
| <p>IS16: System dynamic control using adaptive structures towards improved vibration attenuation and robotic actuation</p> | <p>Shuaishuai Sun, University of Science and Technology of China Yuan Yao, Southwest Jiaotong University Donghong Ning, Ocean University of China Yongqiang Liu, Shijiazhuang Tiedao University Jian Yang, Anhui University</p> |
| <p>IS17: Dynamic modeling and control of complex brain neural system</p> | <p>Ying Wu, Xi'an Jiaotong University Rong Wang, Xi'an Jiaotong University (Xi'an University of Science and Technology) Jiajia Li, Xi'an University of Architecture and Technology Peihua Feng, Xi'an Jiaotong University</p> |
| <p>IS18: Smart materials and vibration control</p> | <p>Wenai Shen, Huazhong University of Science and Technology Huaxia Deng, University of Science and Technology of China</p> |
| <p>IS19: Uncertainty quantification and propagation in dynamic systems</p> | <p>Feng Wu, Dalian University of Technology Bingyu Ni, Hunan University Guijie Li, Dalian University of Technology</p> |

Program in Detail

Opening Ceremony

Date: 08:30-09:00, 26 October 2024 Saturday

Venue: Grand Ballroom (Third Floor)

| Time | | Chair |
|-------------|--|--|
| 08:30-09:00 | Addressing by Prof. Xu Guo, Academician of Chinese Academy of Sciences | Hongfei Ye (Dalian University of Technology) |
| | Addressing by Prof. Xingjian Jing, general chair of ICANDVC | |
| | Featured research introduction by Prof. Dixiong Yang, co-chair of ICANDVC-2024 | |

Plenary Keynote I

Date: 09:00-11:30, 26 October 2024 Saturday

Venue: Grand Ballroom (Third Floor)

| Time | Title | Presenter | Chair |
|-------------|--|---|---|
| 09:00-09:40 | AI-enabled large-scale structural optimization | Xu Guo (Dalian Univ. of Technology) | Shaopu Yang (Shijiazhuang Tiedao Univ.) |
| 09:40-10:10 | Break | | |
| 10:10-10:50 | Nonlinear dynamics of machining processes | Marian Wiercigroch (University of Aberdeen) | Huajiang Ouyang (University of Liverpool) |
| 10:50-11:30 | A Physics-data hybrid framework to develop bridge digital twin model in structural health monitoring | Weixin Ren (Shenzhen University) | Liqun Chen (Shanghai University) |

Program in Detail

Plenary Keynote II

Date: 14:00-17:00, 27 October 2024 Sunday

Venue: Grand Ballroom (Third Floor)

| Time | Title | Presenter | Chair |
|-------------|---|--|---|
| 14:00-14:40 | The mechanics of product disassembly for remanufacturing | Duc Truong Pham (University of Birmingham) | Gang Li (Dalian Univ. of Technology) |
| 14:40-15:20 | Dynamics and bifurcations of product-quadratic nonlinear systems | Albert C. J. Luo (Southern Illinois University Edwardsville) | |
| 15:20-15:40 | Break | | |
| 15:40-16:20 | Multi-objective reliability-based design optimization of structural dynamical systems under stochastic excitation | Hector Jensen (Santa Maria Technical Univ.) | Jiqiang Wang (Ningbo Institute of Materials Tech. & Engineering, CAS) |
| 16:20-17:00 | Advancing vehicle comfort and safety with electrically interconnected suspension systems | Haiping Du (University of Wollongong) | |
| 17:00-17:10 | Closing Ceremony | Xingjian Jing (City University of Hong Kong) | |



Program in Detail

Parallel Sessions

Date: 14:00-11:30, 26 October 2024 Saturday

| Time | Event | | | | | |
|-------------|---|---|---|--|--|--|
| 14:00-15:50 | 1A1 IS01 Venue: Grand Ballroom-1 | 1B1 IS08 Venue: Grand Ballroom-2 | 1C1 IS02 Venue: Grand Ballroom-3 | 1D1 IS15 Venue: Berlin Hall-1 | 1E1 IS13 Venue: Berlin Hall-2 | 1F1 IS06 Venue: Budapest Hall |
| 15:50-16:05 | Break | | | | | |
| 16:05-18:00 | 1A2 IS05 Venue: Grand Ballroom-1 | 1B2 IS14 Venue: Grand Ballroom-2 | 1C2 IS11 Venue: Grand Ballroom-3 | 1D2 IS10 Venue: Berlin Hall-1 | 1E2 IS03 Venue: Berlin Hall-2 | 1F2 IS17 Venue: Budapest Hall |

Date: 08:30-12:15, 27 October 2024 Sunday

| Time | Event | | | | | |
|-------------|---|---|---|--|--|--|
| 08:30-10:05 | 2A1 IS04 Venue: Grand Ballroom-1 | 2B1 IS12 Venue: Grand Ballroom-2 | 2C1 IS19 Venue: Grand Ballroom-3 | 2D1 IS09 Venue: Berlin Hall-1 | 2E1 IS16 Venue: Berlin Hall-2 | 2F1 IS17 Venue: Budapest Hall |
| 10:05-10:20 | Break | | | | | |
| 10:20-12:15 | 2A2 IS05 Venue: Grand Ballroom-1 | 2B2 IS18 Venue: Grand Ballroom-2 | 2C2 IS11 Venue: Grand Ballroom-3 | 2D2 IS10 Venue: Berlin Hall-1 | 2E2 IS03 Venue: Berlin Hall-2 | 2F2 IS01 Venue: Budapest Hall |

Program in Detail

Date: 14:00-17:40, 26 October 2024

Venue: Grand Ballroom-1 (Third Floor)

| 1A1 Nonlinear vibration suppression and energy harvesting Chairs: Shengxi Zhou, Tao Yang, Wei Wang | | |
|--|---|--|
| Time | Title | Presenter |
| 14:00-14:20 | (Session Keynote) Piezoelectric on-shaft torsional vibration energy harvester for self-powered monitoring of geared rotor-bearing system | Zhaoye Qin (Tsinghua University) |
| 14:20-14:35 | Semi-analytical solutions for bending-bending coupled forced vibrations of a rotating wind turbine blade by means of Green's functions | Xiang Zhao (Southwest Petroleum University) |
| 14:35-14:50 | Bifurcation and multi-solution phenomenon of a parametrically excited magnetic rolling pendulum bistable energy harvester | Wei Wang (Zhengzhou University) |
| 14:50-15:05 | Nonlinear dynamic analysis of a fluid-delivering cracked pipe subjected to both pulsation and base excitations | Wenhao Ji (Northeastern University) |
| 15:05-15:20 | A variable potential tristable nonlinear energy sink | Youcheng Zeng (Shanghai University) |
| 15:20-15:35 | High-order optimization of quasi-zero stiffness energy harvesting vibration isolator | Jiayi Liu (Northwestern Polytechnical Univ.) |
| 15:35-15:50 | Influence of laying elastic sleepers on the static and dynamic mechanical behavior of ballast beds in heavy-haul railways | Yihao Chi (Beijing Jiaotong University) |
| 15:50-16:05 | Break | |
| 1A2 Exploring nonlinear benefits in energy harvesting and vibration control Chairs: Meng Li, Yuyang Chai, Jing Bian, Guoqing Jiang, Fengming Li, Yinghui Li | | |
| Time | Title | Presenter |
| 16:05-16:25 | (Session Keynote) A self-powered underwater glider using bi-directional swing-rotation hybrid nanogenerator | Tianzhi Yang (Northeastern University) |
| 16:25-16:40 | Design and modeling of a novel X-shaped isolator with enhanced QZS properties for supporting multiple loads | Yuyang Chai (Harbin Engineering University) |
| 16:40-16:55 | A wind-direction adaptive piezoelectric energy harvester employing small wing passive control configuration | Wan Sun (Jiangsu University) |
| 16:55-17:10 | Optimization method of the bio-inspired multi-articulated vibration isolation platform based on different stewart configurations | Guoqing Jiang (Zhejiang Sci-Tech University) |
| 17:10-17:25 | Towards nonintrusive model reduction of high dimensional finite element models using spectral submanifolds | Mingwu Li (Southern Univ. of Science and Tech.) |
| 17:25-17:40 | Robust discrete variable topology optimization for high dimensional random fields using direct probability integral method | Peihan Chen (Dalian University of Technology) |

Program in Detail

Date: 14:00-17:40, 26 October 2024

Venue: Grand Ballroom-2 (Third Floor)

| 1B1 Robust control for mechanical systems Chairs: Ning Sun, Menghua Zhang, Jing Zhao, Yinan Wu | | |
|---|---|--|
| Time | Title | Presenter |
| 14:00-14:20 | (Session Keynote) Fault-tolerant control for semi-active air suspension via adaptive memory-event-triggered mechanism | Wenfeng Li (Northeastern University) |
| 14:20-14:35 | Modeling of Marine Crane system with complex disturbance and swing reduction control based on energy | Yihao Shi (Shandong Jianzhu University) |
| 14:35-14:50 | Deep deterministic probability prediction control for MRF suspension with sensor disturbances based on feature enhancement | Zhijiang Gao (University of Macau) |
| 14:50-15:05 | Model-restrictive adaptive dynamic programming for mechanical-electromagnetic vibration control of distributed rotor system in corner module architecture vehicle | Jincan Liu (South China Univ. of Technology) |
| 15:05-15:20 | A dynamic search region-based two-layer fast path planning method for indoor firefighting robots | Yu Fu (Nankai University) |
| 15:20-15:35 | Distributed vibration control of large space truss structures with substructure method | Huiyun Pan (Beihang University) |
| 15:35-15:50 | Fuzzy event-triggered preview control for networked active suspensions via V2V communications | Jingang Dong (South China Univ. of Technology) |
| 15:50-16:05 | Break | |
| 1B2 Data-driven modeling and identification of nonlinear systems Chairs: Junyi Cao, Zhong Luo, Lin Du, Changming Cheng | | |
| Time | Title | Presenter |
| 16:05-16:25 | (Session Keynote) Learning structural dynamics with physics-informed neural ODEs | Zhilu Lai (Hong Kong University Of Science and Technology(Guangzhou)) |
| 16:25-16:40 | Physics-constrained hybrid network for identifying nonlinear dynamical systems with partial noisy measurements | Shangyu Zhao (Shanghai Jiao Tong University) |
| 16:40-16:55 | Time-varying mesh stiffness identification of spur gear systems based on weighted sparse regression | Miaomiao Lin (Shanghai Jiao Tong University) |
| 16:55-17:10 | Enhanced Iwan modeling and identification of nonlinear asymmetric softening-hardening hysteretic restoring force | Qinghua Liu (Nanjing Forestry University) |
| 17:10-17:25 | Nonlinear wire rope isolator with magnetic negative stiffness | Ying Zhang (Xi'an Jiaotong University) |
| 17:25-17:40 | Data-driven model reduction for nonlinear dynamical systems by neural fast spectral submanifolds | Siying Lu (Hong Kong University Of Science and Technology(Guangzhou)) |

Program in Detail

Date: 14:00-17:40, 26 October 2024

Venue: Grand Ballroom-3 (Third Floor)

| 1C1 Discontinuous/non-smooth dynamical systems and control of nonlinear systems Chairs: Ling Hong, Jianzhe Huang | | |
|---|--|---|
| Time | Title | Presenter |
| 14:00-14:20 | (Session Keynote) Melnikov method and applications for global dynamical analysis of non-smooth systems | Shuangbao Li <small>(Civil Aviation University of China)</small> |
| 14:20-14:40 | (Session Keynote) Hybrid-map representation for periodic motions of a discontinuous dynamical system: prediction and stability analysis | Jianzhe Huang <small>(Shanghai Jiao Tong University)</small> |
| 14:40-14:55 | Chattering analysis of an oblique impact vibration system with two degrees of freedom | Yujia Ning <small>(Guangxi University)</small> |
| 14:55-15:10 | Optimal trajectory planning method with cell mapping for parafoil system considering complicated constraints | Dongxiao Li <small>(Xi'an Jiaotong University)</small> |
| 15:10-15:25 | Bursting oscillations of non-smooth dynamic systems with a discontinuous boundary involving two state variables | Wenjie Zuo <small>(Jiangsu University)</small> |
| 15:25-15:40 | Crisis dynamics of a class of single-degree-of-freedom piecewise linear oscillators | Han Su <small>(Southwest Jiaotong University)</small> |
| 15:40-15:55 | The multi-objective optimal design for control systems of chaplygin Sleigh by using cell mapping method | Junli Li <small>(Xi'an Jiaotong University)</small> |
| 15:55-16:05 | Break | |
| 1C2 Nonlinear vibration reduction and dynamic design Chairs: Bo Yan, Jiayi Zhou | | |
| Time | Title | Presenter |
| 16:05-16:25 | (Session Keynote) Exploration of low-frequency vibration isolation and rich dynamic behavior of click-beetle-inspired structures | Bo Yan <small>(Zhejiang Sci-Tech University)</small> |
| 16:25-16:40 | Vertical nonlinear dynamic characteristics of single-point suspension vibration isolation system in a maglev train | Minghe Qu <small>(National Univ. of Defense Tech.)</small> |
| 16:40-16:55 | A novel adjustable lever-type dynamic vibration absorber for nonlinear structures | Ning Yu <small>(Zhejiang Sci-Tech University)</small> |
| 16:55-17:10 | Research on the influence of finite contact stiffness on vibration reduction of a vibro-impact nonlinear energy sink system | Yichen Wang <small>(Xi'an Jiaotong University)</small> |
| 17:10-17:25 | A seahorse-skeleton-inspired electromagnetic energy harvester with linear-to-rotation for human motion | Shangwen Wang <small>(Zhejiang Sci-Tech University)</small> |
| 17:25-17:40 | Vibration suppression of floating raft system based on NES cells: experimental and theoretical studies | Hongli Wang <small>(Shanghai University)</small> |

Program in Detail

Date: 14:00-18:00, 26 October 2024

Venue: Berlin Hall-1 (Third Floor)

| 1D1 Nonlinear dynamics and vibration control in marine engineering Chairs: Yu Wang, Haicheng Zhang, Fengming Li | | |
|---|--|--|
| Time | Title | Presenter |
| 14:00-14:20 | (Session Keynote) Comparative study on springing responses of containership CSSRC-20,000TEU | Ye Lu (China Ship Scientific Research Center) |
| 14:20-14:35 | Modelling of multiple-impact jarring | Ekaterina Pavlovskaja (University of Aberdeen) |
| 14:35-14:50 | Cooperative control strategy for a novel ROV-based deep-sea mining system | Yuheng Chen (Hunan University) |
| 14:50-15:05 | Approach for ship angular deformation prediction based on mode superposition | Wei Wu (National Univ. of Defense Tech.) |
| 15:05-15:20 | The frequency veering and mode shape interaction of 3D-Kagome truss core sandwich panel under two certain boundary conditions | Jian Liu (Harbin Engineering University) |
| 15:20-15:35 | Innovative design of pressure-resistant-drag reduction skin based on mechanical metamaterials | Yibin Mao (National Univ. of Defense Tech.) |
| 15:35-15:50 | Genetic programming-assisted design strategies of weak vibration pipe conveying fluid | Tianchang Deng (Shanghai University) |
| 15:50-16:05 | Break | |
| 1D2 Structural nonlinear dynamics, vibration/acoustic control and applications Chairs: Guilin She, Shurui Wen, Xuefeng Wang, Yu Wang | | |
| Time | Title | Presenter |
| 16:05-16:25 | (Session Keynote) Nonlinear aero-thermo-elastic flutter analysis of stiffened graphene platelets reinforced metal foams combined plates with initial geometric imperfection | Guilin She (Chongqing University) |
| 16:25-16:45 | (Session Keynote) Novel vibration isolator with increased Quasi-zero stiffness range | Shurui Wen (Harbin Engineering University) |
| 16:45-17:00 | Response signals prediction of composite rotor blade damage sensors based on operational modal analysis and virtual sensing | Zhiguang Song (Harbin Engineering University) |
| 17:00-17:15 | Dynamical analysis of the hose-drogue system considering attitude change of the tanker | Xuefeng Wang (Northwestern Polytechnical Univ.) |
| 17:15-17:30 | A fundamental and simplest design motif for metamaterials with controllable nonlinearity & guided deformation | Xiaofeng Geng (Hunan Institute of Engineering) |
| 17:30-17:45 | Subharmonic resonance analysis of time delayed asymmetrical stiffness nonlinear systems | Xinliang Liu (Xi'an Jiaotong University) |
| 17:45-18:00 | Dynamic modelling and thermoelastic quality factors of hemispherical shells | Longkai Zheng (Harbin Engineering University) |

Program in Detail

Date: 14:00-17:55, 26 October 2024

Venue: Berlin Hall-2 (Third Floor)

| 1E1 Spacecraft Dynamics and Control Chairs: Haijun Peng, Muqing Niu | | |
|---|---|--|
| Time | Title | Presenter |
| 14:00-14:20 | (Session Keynote) A PID-LQR based vibration active control method and its application in spacecraft control | Shuo Zhang (Northwestern Polytechnical Univ.) |
| 14:20-14:35 | Modeling and load calculation of helicopter blades based on multibody dynamics theory | Chuanda Wang (Dalian University of Technology) |
| 14:35-14:50 | Dynamic analysis of flight vehicle airframe cabins with slot-nut type bolted flange joints | Shuo Zhang (Northwestern Polytechnical Univ.) |
| 14:50-15:05 | Efficient high-fidelity component-level co-rotational coordinate method for dynamic analysis of helicopter rotor systems | Mingdong Chen (Dalian University of Technology) |
| 15:05-15:20 | Wind tunnel test and numerical simulation of start / unstart characteristics of inlet | Chang Liu (China Academy of Aerospace Aerodynamics) |
| 15:20-15:35 | Active control of meshimbrane structures vibration using piezoelectric actuators considering strong electric field nonlinearity | Yu Zhang (Zhejiang University) |
| 15:35-15:50 | Dynamic modeling and fully actuated system control for liquid-filled spacecraft | Fuzheng Xiao (Harbin Institute of Tech. (Shenzhen)) |
| 15:50-16:05 | Break | |
| 1E2 Nonlinear dynamics of rotating machines and applications Chairs: Lei Hou, Zhaoye Qin, Siji Wang, Quankun Li, Xi Chen | | |
| Time | Title | Presenter |
| 16:05-16:25 | (Session Keynote) Dynamic characteristics of rotor-elastic damping support system based on fluid structure coupling | Xi Chen (Southern Univ. of Science and Tech.) |
| 16:25-16:40 | Analytical solution of a dynamics model of microrobot-blood vessel interaction | Gengxiang Wang (University of Exeter) |
| 16:40-16:55 | Optimization design and experimental study on residual unbalance mass distribution of dual-rotor system | Rui Wang (Northwestern Polytechnical Univ.) |
| 16:55-17:10 | Investigation on the nonlinear coupled thermo-mechanical characteristics of a dual-rotor system | Zeyuan Chang (Harbin Institute of Technology) |
| 17:10-17:25 | Study on impact resistance of staggered double elastic ring squeeze film damper | Yuwei Zhang (Northwestern Polytechnical Univ.) |
| 17:25-17:40 | A review of blade vibration suppression methods for large-scale horizontal axis wind turbines | Yaqing Wei (Northwestern Polytechnical Univ.) |
| 17:40-17:55 | A numerical method for structural dynamic analysis of fixed offshore wind turbines considering multi-field interaction | Qianling Ma (Northwestern Polytechnical Univ.) |
| 17:55-18:10 | Nonlinear dynamics of bending-torsion Vortex-induced vibration energy harvester | Mengyu Fan (Harbin Institute of Technology) |

Program in Detail

Date: 14:00-17:55, 26 October 2024

Venue: Budapest Hall (Third Floor)

| 1F1 Random vibration and uncertainty quantification Chairs: Hongzhe Dai, Jianhua Yang, Ping Yi, Guohai Chen | | |
|---|--|---|
| Time | Title | Presenter |
| 14:00-14:20 | (Session Keynote) Unified and efficient method for random vibration and optimal control of structures | Guohai Chen (Dalian University of Technology) |
| 14:20-14:40 | (Session Keynote) An optimal transport method for polynomial chaos representation of non-Gaussian random fields | Ruijing Zhang (Harbin Institute of Technology) |
| 14:40-14:55 | An improved DPIM for stochastic dynamic analysis of FGM cylinders | Zeng Meng (Hefei University of Technology) |
| 14:55-15:10 | Bifurcation induced by stochastic clearance in a rotor system with elastic couplings | Heng Wang (China Univ. of Mining and Tech.) |
| 15:10-15:25 | A multi-fidelity structural reliability analysis method based on kriging and subset simulation | Dashuai Li (Harbin Institute of Technology) |
| 15:25-15:40 | Estimation of the strength characteristics of spatially variable soil using ball penetrometer | Zhixuan Li (Dalian University of Technology) |
| 15:40-15:55 | Efficient stochastic response analysis of imperfect cylindrical stiffened shells with multiple random parameters via neural network-based DPIM | Hanshu Chen (Hohai University) |
| 15:55-16:05 | Break | |
| 1F2 Dynamic modeling and control of complex brain neural system Chairs: Xiaochuan Pan, Xiaojuan Sun, Yanmei Kang | | |
| Time | Title | Presenter |
| 16:05-16:25 | (Session Keynote) The metabolic deficit of ATP modulated neural gamma oscillations during mild cognitive impairment | Jiajia Li (Xi'an University of Architecture and Technology) |
| 16:25-16:40 | The preview control of a corticothalamic model with disturbance | Denggui Fan (Univ. of Science and Tech. Beijing) |
| 16:40-16:55 | Bifurcation and negative self-feedback mechanisms for enhanced spike-timing precision of inhibitory interneurons | Yanbing Jia (Henan Univ. of Science and Tech.) |
| 16:55-17:10 | Different spacial dendritic integration of three types of granule cells in dentate gyrus | Yue Mao (Beijing University of Posts and Telecommunications) |
| 17:10-17:25 | Emergence of pathological beta oscillation and its uncertainty quantification in a time-delayed feedback Parkinsonian model | Yaqian Chen (Xi'an Jiaotong University) |
| 17:25-17:40 | Modelling and synchronization dynamics of inspired neural system with indirect coupling | Yan Shao (Ningxia University) |
| 17:40-17:55 | Regulation mechanism of excitatory circuit on absence seizures | Yitong Ge (North China Univ. of Technology) |
| 17:55-18:10 | Variational integrators on manifolds for constrained mechanical systems | Ziying Lin (Shanghai Jiaotong University) |

Program in Detail

Date: 08:30-11:55, 27 October 2024

Venue: Grand Ballroom-1 (Third Floor)

| 2A1 Stochastic dynamics and statistical application of nonlinear systems Chairs: Wei Li, Dongmei Huang, Liang Wang | | |
|--|---|--|
| Time | Title | Presenter |
| 08:30-08:50 | (Session Keynote) A new LBFNN algorithm to solve FPK equations for stochastic dynamical systems under Gaussian or Non-Gaussian excitation | Wei Li (Xidian University) |
| 08:50-09:05 | A new path integration algorithm for solving the response of an impact system with a soft barrier under stochastic excitation | Yu Wen (Northwestern Polytechnical Univ.) |
| 09:05-09:20 | Analytical analysis of wind-induced vibration energy harvesters under base excitation | Panpan Wang (Xidian University) |
| 09:20-09:35 | Stochastic bifurcation analysis in a tri-stable van der Pol oscillator with fractional derivative under additive and multiplicative Gaussian white noises | Yajie Li (Henan University of Urban and Construction) |
| 09:35-09:50 | Analysis of subresonance resonance of bio-inspired paw-like structures | Xiaofang Duan (Xidian University) |
| 09:50-10:05 | Dynamical evolution of a stochastic colonic crypt model with feedback mechanism and states switching | Mingzhi Lin (Xidian University) |
| 10:05-10:20 | Break | |
| 2A2 Exploring nonlinear benefits in energy harvesting and vibration control Chairs: Meng Li, Yuyang Chai, Jing Bian, Guoqing Jiang, Fengming Li, Yinghui Li | | |
| Time | Title | Presenter |
| 10:20-10:40 | (Session Keynote) Wide quasi-zero stiffness isolator enhancing both low-frequency isolation and support performance | Weiqun Liu (Southwest Jiaotong University) |
| 10:40-10:55 | A self-powered accelerometer using triboelectric-electromagnetic mechanism for vibration and shock events | Huai Zhao (Southwest Jiaotong University) |
| 10:55-11:10 | Decoupled MDOF WECs for enhanced vibration control and energy harvesting of offshore floating wind turbine | Jing Bian (Chongqing University) |
| 11:10-11:25 | Nonlinear X-harvesters: design, analysis, and applications | Meng Li (Southwest Jiaotong University) |
| 11:25-11:40 | Nonlinear dynamic analysis of prestressed suspension-type inerter-based negative-stiffness dampers for wind turbine towers | Ning Su (Northeast Electric Power University) |
| 11:40-11:55 | Performance-based seismic analysis of modular building with vibration devices | Chucheng Qiu (Chongqing University) |
| 11:55-12:10 | Application of RFEM combined with K-MCS for probability analysis of foundation capacity | Xinshuai Guo (Dalian University of Technology) |

Program in Detail

Date: 08:30-12:10, 27 October 2024

Venue: Grand Ballroom-2 (Third Floor)

| Noise and vibration measurement, signal processing and control for transportation equipment Chairs: Dianlong Yu, Y. S. Choy, Liang Yu, Xiaoang Liu, Long Chen | | |
|--|---|--|
| Time | Title | Presenter |
| 08:30-08:50 | (Session Keynote) Noise control technology for building, environment and transportation system | Choy Yat Sze (Hong Kong Polytechnic Univ.) |
| 08:50-09:05 | Broadband low-frequency sound absorbing meta-structures consisting of embedded Helmholtz resonators and gradient-perforated porous materials | Dongyang Li (Hebei University of Technology) |
| 09:05-09:20 | On-board detection method of metro rail corrugation based on unsupervised learning | Yang Wang (Beijing Jiaotong University) |
| 09:20-09:35 | Vibroacoustic and sound radiation analysis of a nonlinear plate-cavity system under thermal load | Qing Luo (Southwest Jiaotong University) |
| 09:35-09:50 | The unconventional codimension-two bifurcation analysis of a class of hybrid rigid-elastic constraint systems | Zhongjia Li (Guangxi University) |
| 09:50-10:05 | Natural vibration of critical double-span functionally graded pipe conveying fluid reinforced by graphene platelets | Mengyuan Hao (Shanghai University) |
| 10:05-10:20 | Break | |
| Smart materials and vibration control Chairs: Wenai Shen, Huaxia Deng | | |
| Time | Title | Presenter |
| 10:20-10:40 | (Session Keynote) Vibration control technology using magnetorheological smart materials | Huaxia Deng (Univ. of Science and Tech. of China) |
| 10:40-10:55 | Active pendulation control of hoisting systems of ship-mounted cranes under ocean wave excitations | Wenai Shen (Huazhong Univ. of Science and Tech.) |
| 10:55-11:10 | Multimodal semi-active dynamic vibration absorber array with ultra-wideband vibration reduction characteristics based on magnetorheological elastomers | Hang Ren (Harbin Engineering University) |
| 11:10-11:25 | Modeling of piezo-induced wave propagation in curvilinear composite structures using the high-order spectral element | Maoling Yue (Northwestern Polytechnical University) |
| 11:25-11:40 | Mode separation of elastic waves in topological metamaterials for energy harvesting | Kangkang Chen (Shanghai Jiao Tong University) |
| 11:40-11:55 | Geometrically nonlinear analysis of piezoelectric laminated composite beams considering strong electric field nonlinearity and temperature dependence under thermo-electro-mechanical loads | Xuankai Guo (Zhejiang University) |
| 11:55-12:10 | Spatiotemporal dynamics and modelling of neuromorphic memristive Josephson junctions | Xiangshu Feng (Ningxia University) |

Program in Detail

Date: 08:30-12:10, 27 October 2024

Venue: Grand Ballroom-3 (Third Floor)

| 2C1 Uncertainty Quantification and Propagation in Dynamic Systems Chairs: Feng Wu, Bingyu Ni, Guijie Li | | |
|--|---|--|
| Time | Title | Presenter |
| 08:30-08:50 | (Session Keynote) Low-discrepancy sampling method and its application in uncertainty quantification analysis | Feng Wu (Dalian University of Technology) |
| 08:50-09:05 | Uncertainty propagation of high-dimensional nonlinear vibrations via reduction on spectral submanifolds | Mingwu Li (Southern Univ. of Science and Tech.) |
| 09:05-09:20 | The first-order time-variant reliability expansion method | Weiwei Chen (Hunan University) |
| 09:20-09:35 | Wiener interval process and its application in the remaining useful life estimation of equipment | Tao Qi (Hunan University) |
| 09:35-09:50 | The discussion of construction method for minimum interval radius-based interval process model | Yuxiang Yang (Dalian University of Technology) |
| 09:50-10:05 | Uncertainty analysis of the dynamic response of bolted structures with stochastic parameters | Chenyang Mao (Dalian University of Technology) |
| 10:05-10:20 | Break | |
| 2C2 Nonlinear vibration reduction and dynamic design Chairs: Bo Yan, Jiaxi Zhou | | |
| Time | Title | Presenter |
| 10:20-10:40 | (Session Keynote) Fractional nonlinear energy sinks for mi-cro-vibration mitigation | Jiaxi Zhou (Hunan University) |
| 10:40-10:55 | Buckling-induced high-static-low-dynamic stiffness vibration isolator with semi-active nonlinear damping | Hongye Ma (Zhejiang Sci-Tech University) |
| 10:55-11:10 | Study on the characteristics of a VINES shock absorber through high-order modal damping energy loss | Guoxin Mao (Xi'an Jiaotong University) |
| 11:10-11:25 | Low-frequency human motion energy scavenging with wearable tumbler-inspired electromagnetic energy harvesters | Xiagui Pan (Zhejiang Sci-Tech University) |
| 11:25-11:40 | Modelling and analysis of gradient metamaterials for broad fusion bandgap | Changqi Cai (Zhejiang Sci-Tech University) |
| 11:40-11:55 | Modeling of pipes covered by visco-hyperelastic materials and vibration damping discussion | Jie Jing (Shanghai University) |
| 11:55-12:10 | The dynamic behavior of water film on cylindrical surface under harmonic and impact excitations | Yiming Huang (Hefei University of Technology) |

Program in Detail

Date: 08:30-12:15, 27 October 2024

Venue: Berlin Hall-1 (Third Floor)

| 2D1 Nonlinear control for underactuated mechanical systems Chairs: Yingbo Huang, Zixin Huang | | |
|---|--|--|
| Time | Title | Presenter |
| 08:30-08:50 | (Session Keynote) New type of insoles based on air pressure arrays for fall detection in the elderly | Zixin Huang (Wuhan Institute of Technology) |
| 08:50-09:05 | Relationship between time delay and feedback control parameters of maglev train-rail coupling system | Yan Xu (Tongji University) |
| 09:05-09:20 | Dynamics analysis and tracking control of underactuated offshore ship-to-ship crane system | Guangrui Luan (Ocean University of China) |
| 09:20-09:35 | Improving propulsive performance through coupling elastic two-DoFs motion | Yiming Lu (Hunan University) |
| 09:35-09:50 | Semi-analytic modeling and experimental research of fluid-conveying pipes treated by partial CLD | Hongwei Ma (Northeastern University) |
| 09:50-10:05 | Vibration characteristics and quality factor analysis of cylindrical shell resonators considering non-uniform surface damage | Wei Gao (Harbin Engineering University) |
| 10:05-10:20 | Break | |
| 2D2 Structural nonlinear dynamics, vibration/acoustic control and applications Chairs: Zhiguang Song, Guo Yao, Zhijing Wu, Yu wang | | |
| Time | Title | Presenter |
| 10:20-10:40 | (Session Keynote) Nonlinear vibration and stability of an axially moving two-stage beam with internal hinge | Guo Yao (Northeastern University) |
| 10:40-11:00 | (Session Keynote) Investigations on wave propagation and vibration localization characteristics of nonlinear chain metastructures | Yu Wang (Harbin Engineering University) |
| 11:00-11:15 | Vibration suppression characteristics of a thin sandwich panel with folding spider-web-like phononic crystal cores | Fulong Zhao (Harbin Engineering University) |
| 11:15-11:30 | Dual-band topological waveguide in tunable mechanical metamaterials | Lingfan Cui (Tianjin University) |
| 11:30-11:45 | Three-dimensional nonlinear vortex-induced vibrations of top-tension risers | Bin Zhang (Harbin Engineering University) |
| 11:45-12:00 | Development of a virtual ground testing model for aerospace electromechanical actuator design performance evaluation | Shilin Yang (Northwestern Polytechnical University) |
| 12:00-12:15 | Study on nonlinear dynamic response and fault diagnosis of non-uniform boundary bolted rotating cylindrical shells | Jiucun Wei (Harbin Engineering University) |

Program in Detail

Date: 08:30-12:10, 27 October 2024

Venue: Berlin Hall-2 (Third Floor)

| 2E1 System dynamic control using adaptive structures towards improved vibration attenuation and robotic actuation Chairs: Shuaishuai Sun, Yuan Yao, Donghong Ning, Yongqiang Liu, Jian Yang | | |
|--|--|--|
| Time | Title | Presenter |
| 08:30-08:50 | (Session Keynote) Body attitude control system for magnetorheological vehicle suspension based on IMU solution | Jian Yang (University of AnHui) |
| 08:50-09:05 | A study on the hydrodynamic propulsion performance of a bionic sea turtle flipper | Mingguang Gong (Ocean University of China) |
| 09:05-09:20 | Development of a semi-active suspension using a compact magnetorheological damper with negative-stiffness components | Tao Hu (Univ. of Science and Tech. of China) |
| 09:20-09:35 | Development of novel magnetorheological dampers with low-speed sensitivity for flying car suspensions | Lan Jiang (Univ. of Science and Tech. of China) |
| 09:35-09:50 | Magnetorheological motors: enhancing jumping, load capacity, and energy efficiency in single-legged robots | Erwin Ang Tien Yew (Univ. of Science and Tech. of China) |
| 09:50-10:05 | Development of magnetorheological assisted steering system for overshoot control using variable damping in autonomous vehicles | Burhan Afzal (Univ. of Science and Tech. of China) |
| 10:05-10:20 | Break | |
| 2E2 Nonlinear dynamics of rotating machines and applications Chairs: Lei Hou, Zhaoye Qin, Siji Wang, Quankun Li, Xi Chen | | |
| Time | Title | Presenter |
| 10:20-10:40 | (Session Keynote) Active vibration control of the rotor system in aero engines | Siji Wang (Northwestern Polytechnical Univ.) |
| 10:40-10:55 | Investigations of aero-elastic coupling based control strategy of a flexible wind turbine blade: principle and experiment | Jingwei Zhou (Beijing Goldwind Science & Creation Windpower Equipment Co., Ltd) |
| 10:55-11:10 | Experimental study on vibration damping characteristics of static eccentric squeeze film damper | Yu Li (Northwestern Polytechnical Univ.) |
| 11:10-11:25 | Simulation analysis of stiffness and strength characteristics of Curvic couplings | Xin Wang (Northwestern Polytechnical Univ.) |
| 11:25-11:40 | Directional phase transition of nonlinear elastic solitons | Wu Zhou (Tianjin University) |
| 11:40-11:55 | Influence of cubic nonlinearity on the bandgap of diatomic periodic chains | Qinglin Jia (Xi'an Jiaotong University) |
| 11:55-12:10 | Boundary behaviors of a current-type Boost converter containing switched inductors | Changxuan Guan (Nanjing Normal University) |

Program in Detail

Date: 08:30-12:10, 27 October 2024

Venue: Budapest Hall (Third Floor)

| 2F1 Dynamic modeling and control of complex brain neural system Chairs: Rong Wang, Hongyi Wang, Yuye Li | | |
|---|---|--|
| Time | Title | Presenter |
| 08:30-08:50 | (Session Keynote) Whole-brain modeling study of transcranial direct current stimulation to inhibit seizure propagation | Ying Yu (Beihang University) |
| 08:50-09:05 | A Spatial cognitive neurodynamics inspired SLAM algorithm based on A-KAZE feature recognition | Ruibang Li (East China Univ. of Science and Tech.) |
| 09:05-09:20 | A neural dynamics approach using cortex-thalamus-basal ganglia loops for modeling brain fatigue | Peihua Feng (Xi'an Jiaotong University) |
| 09:20-09:35 | Kinetic modeling of cortical slow wave oscillations and thalamic spindle waves during sleep | Shu Wang (East China Univ. of Science and Tech.) |
| 09:35-09:50 | Regulation of XOR function of reduced human L2/3 pyramidal neurons | Yanheng Li (Beijing University of Posts and Telecommunications) |
| 09:50-10:05 | Stiffness and damping features of brain complex networks | Haojun Liu (Xi'an Jiaotong University) |
| 10:05-10:20 | Break | |
| 2F2 Nonlinear vibration suppression and energy harvesting Chairs: Huliang Dai, Zeqi Lu, Yilong Wang | | |
| Time | Title | Presenter |
| 10:20-10:40 | (Session Keynote) Performance enhancements of parametrically excited energy harvesters | Yimin Fan (Harbin Institute of Technology) |
| 10:40-10:55 | Design and development of a novel energy harvesting inerter damper for rail tracks | Yu Pan (Tongji University) |
| 10:55-11:10 | Exploiting weak softening in linear spring for improved near resonant vibration isolation in pivoted levered mechanisms | Chung Ket Thein (Univ. of Nottingham Ningbo China) |
| 11:10-11:25 | Oscillation suppression of attractive-repulsive coupled oscillators with higher-order interaction | Zhonghua Zhang (Northwestern Polytechnical Univ.) |
| 11:25-11:40 | Multi-directional wind energy harvesting based on coupled effect between piezoelectric beam and elastic supported sphere | Liyong Wu (Huazhong Univ. of Science and Tech.) |
| 11:40-11:55 | A hybrid electromagnetic and flexible piezoelectric energy harvester for low-frequency human motions | Yue Zhu (Northwestern Polytechnical Univ.) |
| 11:55-12:10 | Differential-algebraic Neural Networks for Nonlinear Dynamic Analysis | Jieyu Ding (Qingdao University) |



Conference Venue

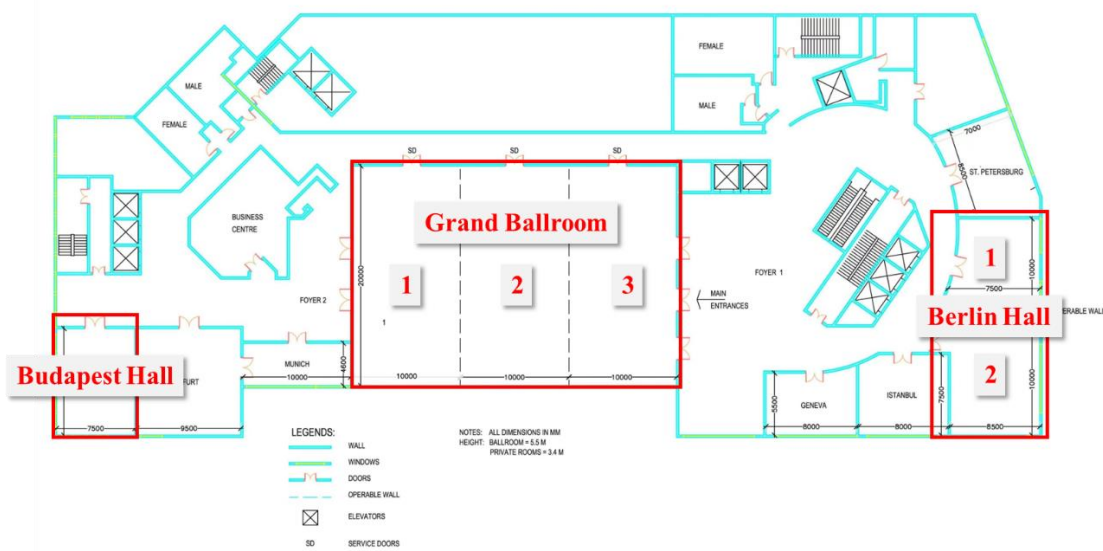
Venue: Kempinski Hotel Dalian, No. 92 Jiefang Road, Zhongshan, Dalian



Second Floor Plan



Third Floor Plan





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