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Indira Narayanaswamy · Dhish Kumar Saxena
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Advances in Multidisciplinary Analysis and Optimization

Proceedings of the 2nd National Conference on Multidisciplinary Analysis and Optimization

Springer

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Preface

This book contains selected papers from the 2nd National Conference on Multidisciplinary Design, Analysis and Optimization (NCMDAO-2) which was held at Bengaluru between March 21 and 23, 2019. The conference was held at Ramaiah University of Applied Sciences (RUAS) in collaboration with Design Division of Aeronautical Society of India (AeSI), Mechanical Engineering Department of Indian Institute of Science (IISc) and Engineering Design Department of Indian Institute of Technology (IIT), Madras. This conference was second in annually planned event to create a platform for researchers and industry professionals working in the area of multidisciplinary design, analysis and optimization to share their current work.

The need for optimization is heightened in today's multidisciplinary R&D environment. Optimization helps us push the boundaries to make the most out of limited resources. Aerospace, automotive, manufacturing, biomedical and many other fields significantly benefit from optimization and gain a competitive edge. Advances in optimization theory, algorithms and software have made it possible to improve the performance and economy of components, devices, processes and entire systems. Efficient analysis and design are possible even for those problems where analytical and computational models are not available. Robust design under uncertainty is also pursued vigorously. The conference was organized with these goals in mind.

The response from various government laboratories, academic institutions, aerospace industries and private companies was overwhelming with roughly 140 registered participants attending the two-day conference. Over 30% of the contributed papers were from the manufacturing and consulting industries, while rest of them were from academic institutions and government research laboratories such as ISRO, ADA and DRDO. Over the two days of the conference, about 65 papers were presented out of which over 40 full papers were contributed. These papers were peer-reviewed through an online and offline system, and a total of 27 high-quality papers are being included in this proceedings.

The conference was held over two days with a pre-conference workshop which was introduced to disseminate information on new areas of study in optimization. Pre-conference workshop included four talks and had close to 100 registrants. The session included a talk on advances in machine learning, AI and deep learning by

Dr. Somanath Nagendra, P&W USA; a talk on surrogate modeling techniques by Mr. Mohan Sangli, Intuceo; and followed by a talk on probabilistic design by Mr. Vinay Ramanath, Siemens Corporate Research. Finally, a talk and demo on optimization of composite materials by Mr. Sushil Mane, Altair Engineering, capped end of the master class.

The main conference included three keynote talks from industry stalwarts, two invited talks, sponsor presentations and a panel discussion. One of the keynotes was delivered by Prof. (Dr.) Garret Vanderplaats, CEO of VR&D, and internationally acclaimed professor and researcher in structural optimization. Dr. Vanderplaats presented a recorded talk on perspectives and history of optimization which enthralled the audience with a glimpse of growth of optimization technology and key contributors to the field. The conference agenda was divided into 12 sessions of which six were parallel sessions. Each session had roughly five to six papers. A highlight of the conference was a session for rapid-fire introduction of papers being presented during each of the two halves of the day. During this session, each presenter would speak about his paper for roughly 2 min, providing an opportunity for the participants to select sessions of their interest. Each paper was scheduled based on session theme. The following were the themes of the conference:

Session 1A	MDO and Applications: Aerospace Engineering
Session 1B	Machine Learning and Neural Networks in Optimization
Session 2A	MDO and Applications: Automotive Engineering
Session 2B	Optimization Algorithms and Methods
Session 3A	MDO and Applications: Automotive Engineering
Session 3B	Optimization Algorithms and Methods
Session 4A	Shape and Topology Optimization Applications
Session 4B	Approximation Methods and Surrogate Models
Session 5A	MDO and Applications: Aerospace Engineering
Session 5B	Optimization Algorithms and Methods
Session 6A	MDO and Applications: Automotive Engineering
Session 6B	General Application of Optimization in Engineering

The conference was sponsored by leading industries in the field of optimization such as MSC Software, VR&D (Optisign), Metacomp Technologies, Zeus Numerix, Acer and Siemens besides strong support from SAEINDIA, Aerospace Society of India and Springer.

The papers included in this proceedings were selected based on a rigorous review considering theme of the conference in mind. We hope that this collection of work would ignite further interest in this field in the country and will continue to be active for years to come with increased contribution.

Bengaluru, India

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Prof. Indira Narayanaswamy
Prof. Dhish Kumar Saxena

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Dr. Raviprakash R. Salagame brings over 25 years of industry experience. He is currently a senior global leader at APTIV Technical Center India. Previously, Ravi held leadership and engineering positions at GE Corporate Research Center (at JFWTC) and IBM Almaden Research Center at San Jose, California. He completed his Ph.D. in Mechanical Engineering from Pennsylvania State University in 1995, Master's degree from Indian Institute of Science in 1988 and Bachelor's degree from BMS College of Engineering in 1986. He is a certified Six Sigma black belt and a technical expert in Design Optimization, CAE, data science and statistical methods. He has published over 15 international journal and conference papers and delivered several industry keynotes in India. He also serves on the board of IUCEE (Indo-Universal Collaboration for Excellence in Engineering Education) and a few of the leading universities in India.

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brings on board his work experience in the United Kingdom where he worked with universities like Cranfield and Bath, in collaboration with companies like British Aerospace Systems, Hewlett Packard, and Airbus.

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