

Special Session

Code: 3496b

Title

Recent Advances in Intelligent Manufacturing System Scheduling and Optimization

Proposer / Main Organizer

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XiWang Guo received his B.S. degree in Computer Science and Technology from Shenyang Institute of Engineering, Shenyang, China, in 2006, M.S. degree in Aeronautics and Astronautics Manufacturing Engineering. from Shenyang Aerospace University, Shenyang, China, in 2009, Ph. D. degree in System Engineering from Northeastern University, Shenyang, China, in 2015. He is currently an associate professor of the College of Computer and Communication Engineering at Liaoning Petrochemical University. From 2016 to 2018, he was a visiting scholar of Department of Electrical and Computer Engineering, New Jersey Institute of Technology, Newark, NJ, USA. He has authored 90+ technical papers in journals and conference proceedings, including IEEE Transactions on Cybernetics, IEEE Transactions on System, Man and Cybernetics: Systems, IEEE Transactions on Intelligent Transportation Systems, and IEEE/CAA Journal of Automatica Sinica. His current research interests include Petri nets, remanufacturing, recycling and reuse of automotive, intelligent optimization algorithm.

Jiacun Wang received the Ph.D. degree in computer engineering from Nanjing University of Science and Technology (NUST), China, in 1991. He is currently a Professor of software engineering at Monmouth University, West Long Branch, New Jersey, USA. From 2001 to 2004, he was a member of scientific staff with Nortel Networks in Richardson, Texas. Prior to joining Nortel, he was a research associate of the School of Computer Science, Florida International University at Miami. His research interests include software engineering, discrete event systems, formal methods, machine learning, and real-time distributed systems. He authored Timed Petri Nets: Theory and Application (Kluwer, 1998), Real-time Embedded Systems (Wiley, 2018) and Formal Methods in Computer Science (CRC, 2019), edited Handbook of Finite Stat Based Models and Applications (CRC, 2012), and published over 130 research papers in journals and conferences. Dr. Wang was an Associate Editor of IEEE Transactions on Systems, Man and Cybernetics,

Part C, and is currently Associate Editor of IEEE/CAA Journal of Automatica Sinica. He has served as general chair, program chair, and special sessions chair or program committee member for many international conferences. He is a senior member of IEEE.

IEEE Member or SMC Society Member

Please specify

XiWang Guo, IEEE Member and Society Member

Jiacun Wang, IEEE Senior Member

Category

Please select one of the following categories:

- Cybernetics

Number of Expected Paper Submissions:

6 or more

Keywords

Manufacturing systems, scheduling, optimization, modeling, simulation, digital twin, IoT, intelligent control, reinforcement learning.

Brief Description and Justification (200-250 words):

Over the last decades, significant advancement in information technology, such as artificial intelligence, cloud computing, internet of things and big data analysis have generated numerous opportunities for continuous improvement and innovations in manufacturing. Meanwhile, new challenges have emerged for applying and implementing these techniques and innovations. This special session aims to bring together academic researchers and industrial practitioners on new models, solutions, methodologies, algorithms, case studies, surveys on topics related to product assembly, disassembly, additive manufacturing, digital manufacturing, and cyber-physical solutions regarding manufacturing system design, control, scheduling and optimization. The focus is put on system scheduling and optimization. Topics to be covered include, but are not limited to, the following:

- Design, control and optimization of assembly systems
- Design, control and optimization of disassembly systems
- Digital twin techniques in manufacturing
- Emission control and energy saving in manufacturing
- End-of-life product recycling
- Formal methods in the modeling, verification and analysis of manufacturing systems, such as Petri nets, UML, queuing theory, model checking techniques, etc.
- Heuristic search algorithms
- Intelligent factory
- Real-time operation management
- Real-time task allocation

- Real-time task scheduling
- Machine learning and reinforcement learning in manufacturing
- Smart sensing and control
- Smart logistics management
- System simulation and performance evaluation
- Sustainability manufacturing
- Workstation load balancing in manufacturing, assembly and disassembly