10th IFAC Conference on Manufacturing Modelling, Management, and Control (MIM 2022)

IFAC PapersOnline Volume 55, Issue 10

Nantes, France
22-24 June 2022

Part 1 of 5

Editors:

Alain Bernard
Aledandre Dolgui
Hichem Haddou Benderbal
Dmitry Ivanov
David Lemoine
Fabio Sgarbossa

ISBN: 978-1-7138-6512-4

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571

Some format issues inherent in the e-media version may also appear in this print version.

To the extent permissible under applicable laws, no responsibility is assumed by the Owner, the Publisher or the Licensee for any injury and/or damage to persons or property as a result of any actual or alleged libelous statements, infringement of intellectual property or privacy rights, or products liability, whether resulting from negligence or otherwise, or from any use or operation of any ideas, instructions, procedures, products or methods contained in the material therein.

The publication of an advertisement in the POD Edition does not constitute on the part of the Owner, the Publisher or the Licensee a guarantee or endorsement of the quality or value of the advertised products or services described therein or of any of the representations or the claims made by the advertisers with respect to such products or services.

Copyright© (2022) by the authors
Open access publication under the CC-BY-NC-ND License
https://creativecommons.org/licenses/by-nc-nd/4.0/
All rights reserved.

Printed with permission by Curran Associates, Inc. (2023)

For permission requests, please contact the publisher, Elsevier Limited
at the address below.

Elsevier Limited
The Boulevard, Langford Lane
Kidlington
Oxford OX5 1GB UK

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
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

PART 1

Predicting Makespan in Flexible Job Shop Scheduling Problem Using Machine Learning 1
David Tremblet, Simon Thevenin, Alexandre Dolgui

The Development Process of Responsible AI: The Case of ASSISTANT 7
Johan Buchholz, Benedict Lang, Eduardo Vyhmeister

Knowledge Graphs in Digital Twins for Manufacturing - Lessons Learned from an Industrial Case at Atlas Copco Airpower 13
Bart Meyers, Johan Van Noten, Pieter Lietaert, Bavo Tielemans, Klaas Gadeyne

Domain Models and Data Modeling as Drivers for Data Management: The ASSISTANT Data Fabric Approach 19
Per-Olov Östberg, Eduardo Vyhmeister, Gabriel G. Castañé, Bart Meyers, Johan Van Noten

Mixed-Model Assembly Line Design with New Product Variants in Production Generations 25
S. Ehsan Hashemi-Petroodi, Simon Thevenin, Alexandre Dolgui

Joint Optimization of Bunker Fuel and Vessel Speed Considering Delay and Carbon Emission 31
Jyotirmoy N. Das, Jasashwi Mandal, Hema Date, Manoj K. Tiwari

Digital Operations Scheduling, Workflow Management, and Performance Measures of Factors Responsible for Disruption in Industry 4.0 Supply Chain 37
Mayank Shukla, Manoj Kumar Tiwari

MCDM Approach to Select IoT Devices for the Reverse Logistics Process in the Clinical Trials Supply Chain 43
Yvonne Badulescu, Manoj Kumar Tiwari, Naoufel Cheikhrouhou

Machine Learning for the Future Integration of the Circular Economy in Waste Transportation and Treatment Supply Chain 49
Hmamed Hala, Cherrafi Anass, Benghabrit Youssef

Scaling Up the Digitalization of the Public Distribution System: A COVID-19 Pandemic Impetus 55
Ramesh Kumar, L. Ganapathy, Ravindra Gokhale, Manoj Kumar Tiwari

Balance Efficient Shuttle Routing and Fast Order Execution on a Vehicle Compound 61
Tobias Sprodowski, Marit Hoff-Hoffmeyer-Zlotnik, Michael Freitag

Modelling Framework for Reinforcement Learning Based Scheduling Applications 67
Lennart M. Steinbacher, Abderahim Ait-Alla, Daniel Rippel, Tim Düe, Michael Freitag

An Ant Approach to Define Product Families and Remanufacturing Cells 73
Camilo Mejia-Moncayo, Alix E. Rojas, Jean-Pierre Kenne, Lucas A. Hof

Making Decisions in Highly Uncertain and Opportunistic Environments: Towards a Decision Support System for Sales and Operations Planning 79
Danielle Fakhry, Raphaël Oger, Matthieu Lauras

Supply Chain Resilience in Turbulent Times: Conceptual Model and Real-World Use Case 85
Silvio Luiz Dos Santos Alvim, Ingra Viel De Farias, Enzo Morosini Frazzon, Davi De Simas

Influence of Task Time Variation in Adopting Walking Worker Assembly Systems: A Design Approach 91
Martina Calzavara, Maurizio Faccio, Serena Finco, Alessandro Persona, Ilenia Zennaro

Mixed-Flow Assembly Line Balancing with Uncertain Assembly Times in Remanufacturing 97
Qingtao Liu, Jiayao Song, Jingxiang Lv, Ou Tang, Zeyu Zhang

Parallel Assembly Line Balancing Model with Tooling Consideration and Demand Fulfilment (ALBPTD) 103
Esam Alhomaidi, Ronald G. Askin

A Case Study on the Integration of Assembly Line Balancing and Feeding Decisions 109
Nico A. Schmid, Benoit Montreuil, Veronique Limère

System Reconfiguration for Reverse Logistics: A Case Study 115
Oritsegbubemi Omatseye, R. Jill Urbanic

Automated Delivery Robots: A Vehicle Routing Problem on Last Mile Delivery Cost Per Unit Based on Range and Carrying Capacity 121
Perrinaud Corentin, Saraceni Adriana

Quantifying Smart Parcel Station Network Usage as a Logistical Solution for the Last-Mile Problem 127
Abdullah Sweidan, Adel Elomri, Laoucine Kerbache

A Simulation-Based Optimization Model for the Vehicle Routing Problem with Bimodal Stochastic Travel Time Distribution 133
Amina Antit, Amel Jaoua, Safa Bhar Layeb, Chefi Triki

Developing a Conceptual Business Model Framework for Shared Electric-Micro-Mobility Services: A Systematic Literature Review 139
Minli Song, Meng Meng, Li Zhou, Petros Ieromonachou

Location of Micro-Urban Consolidation Centres for the Superblocks in Barcelona 145
Maria Savall-Manyó, Imma Ribas

Potential of Mobile Applications in Human-Centric Production and Logistics Management 151
Minqi Zhang, Eric H. Grosse, Christoph H. Glock

Considering Physical Workload and Workforce Diversity in a Collaborative Assembly Line Balancing (C-ALB) Optimization Model. 157
Ali Keshvarparast, Olga Battaia, Amir Pirayesh, Daria Battini

Real-Time Postural Training Effects on Single and Multi-person Ergonomic Risk Scores 163
Nicola Berti, Serena Finco, Mattia Guidolin, Monica Reggiani, Daria Battini

An Action-Based Model to Identify Human Competencies Through the Trace of Actions: Case of a Building Energy Engineering Company 169
K. Mlaouhi, C. Cholez, L. Gzara

The Role of Environmental Factors in the Flexible Job-Shop Scheduling Problem: A Literature Review 175
Masoumeh Hassanchokami, Alejandro Vital-Soto, Jessica Olivares-Aguila

Simultaneous Job-Shop Scheduling and Maintenance Planning with Energy Consideration 181
Shrajal Gupta, Ajai Jain

Permutation Flowshop Scheduling Problem with Total Core Idle Time Minimization 187
Sanchez-De-Los-Reyes Paula, Perez-Gonzalez Paz, M Framinan Jose

Energy-Efficient Job Shop Scheduling Considering Processing Speed and Incentive-based Programs..... 192
Marc Füchtenhans, Christoph H. Glock

HFMEA-Fuzzy Model: Risk Assessment of 47 Emergency Care Units (ECU's) 198
Harvey J. S. R Cosenza, Nilra A. M. Silva, Ana Paula B. Sobral, Stephanie D. Nascimento, Robisom D. Calado

Patient Flow Optimization: SMED Adoption in Emergency Care Units 204
Andrei Bonamigo, Patricia Mendonça Maia Bernardes, Luiz Felipe Conrado, Luis Fernando Torres, Robisom Damasceno Calado

Queuing Theory: Contributions and Applications in the Field of Health Service Management– A Bibliometric Approach..... 210
A. B. Santos, R. D. Calado, A. C. S. Zeferino, S. C. Bourguignon

DMAIC in Improving Patient Care Processes: Challenges and Facilitators in Context of Healthcare 215
Milena Estanislau Diniz Mansur Dos Reis, Melissa Felix De Abreu, Olavo De Oliveira Braga Neto, Luis Enrique Valdiviezo Viera, Robisom Damasceno Calado

Fast-Track 24-Hour UPA: Analysis of Opportunities and Continuous Improvements Through IRAMUTEQ..... 221
Sma Chaves, R. D Calado, S. C Bourguignon, L. E. V Viera, O. O. Braga Neto

Routing Decisions of a Hybrid Vehicle on Electric Road Networks..... 227
Alejandro Gutierrez-Alcoba, Roberto Rossi, Belen Martin-Barragan, Tim Embley

Solving Large Scale Vehicle Routing Problems with Hard Time Windows Under Travel Time Uncertainty 233
K Haripriya, Viswanath Kumar Ganesan

Distributed Data-Driven Control of Transportation Networks..... 239
Vladimir Toro, Eduardo Mojica-Nava, Naly Rakoto-Ravalontsalama

Tour Scheduling in Attended Home Delivery 245
Tom Perroux, Fabien Lehuédé, María I. Restrepo

Conceptual Framework for Assessing Sustainability of Urban Freight Transport 251
Hana Ayadi, Nadia Hamani, Mounir Benaissa, Lyes Kermad

Demand Driven MRP with Supplier Selection..... 257
Abdelhalim Achergui, Hamid Allaoui, Tiente Hsu

A Simulation-Optimization Approach to Parameterize Demand-Driven Material Requirements Planning..... 263
David Damand, Youssef Lahrichi, Marc Barth

Echelon Base Stock Policy for Symbiotic and Reverse Logistic Flows..... 269
Sophie Hennequin, Mohammad Amin Yazdani, Daniel Roy

Multi-Objective Production Planning of New and Remanufactured Products in Hybrid Production System 275
H. Lahmar, M. Dahane, K. N. Mouss, M. Haoues

Social Computational Design Method for Generating Product Shapes with GAN and Transformer Models 281
Maolin Yang, Tianshuo Zang, Pingyu Jiang

A Review Paper on Low Light Image Enhancement Methods for Un-Uniform Illumination 287
Ashish Kumar Mishra, Chandra Sekhar Panda

Extension of the CCMS 2.0 Maturity Model Towards Artificial Intelligence 293
Gábor Nick, Andrea Ko, Ádám Szaller, Klaudia Zeleny, Tibor Kovács

Towards a Blockchain-Based Smart Farm Agricultural Revolution in Sub-Saharan Africa. 299
Doriane Micaela Andeme Bikoro

Managing Panic Buying-Related Instabilities in Supply Chains: A COVID-19 Pandemic Perspective 305
Towfique Rahman, Sanjoy Kumar Paul, Nagesh Shukla, Renu Agarwal, Firouzeh Taghikhah

Supply Chain Sustainability and Resilience - Relationship and Congruent Capability Analysis Based on Paradox Theory 311
Piotr Warmbier, Aseem Kinra, Dmitry Ivanov

Modelling COVID-19 Supply Chain Disruption and Recovery: A Case Study from the E-commerce Industry 317
Priya Muralidharan, Vincent Hargaden, Pezhman Ghadimi

Business Continuity, Disaster Readiness and Performance in COVID-19 Outbreak Aftermath: A Survey 323
Jamal El Baz, Salomée Ruel

Augmented Reality in Logistics 4.0: Implications for the Human Work 329
Alexandra Lagorio, Valentina Di Pasquale, Chiara Cimini, Salvatore Miranda, Roberto Pinto

Development of a Multi-Agent System to Tackle Communication Fragmentation and Information Exchange in the Construction Industry 335
Hasitha Perera, Amir Hossein Azadnia, Pezhman Ghadimi

Wearable Devices for Health and Safety in Production Systems: A Literature Review 341
Valentina Di Pasquale, Valentina De Simone, Martina Radano, Salvatore Miranda

Agent's Motor Performance: An Index of Difficulty-Based Model 347
Andrea Lucchese, Giovanni Mummolo, Salvatore Digiesi, Carlotta Mummolo

Modular Reconfiguration of Flexible Production Systems Using Machine Learning and Performance Estimates 353
D. Scrimieri, O. Adalat, S. Afazov, S. Ratchev

Reinforcement Learning and Digital Twin-Based Real-time Scheduling Method in Intelligent Manufacturing Systems 359
Lixiang Zhang, Yan Yan, Yaoguang Hu, Weibo Ren

Human Intention and Workspace Recognition for Collaborative Assembly 365
Nishant Ketan Gajjar, Khansa Rekik, Ali Kanso, Rainer Müller

Decision Modeling for an ISA-95 Based Production Ontology 371
Annelie Sohr, Franz Georg Listl, Katharina Ecker, Jan Fischer, Michael Weyrich

Lessons Learn on Responsible AI Implementation: The ASSISTANT Use Case 377
Eduardo Vyhmeister, Gabriel G. Castane, Johan Buchholz, Per-Olov Östberg

Multi-Partners Digital Project Twin: A Tool for Project Monitoring 383
Félicien Barhebwa-Mushamuka, Sarah Wagner

Prediction of Turn Around Time Using Neural Networks - A Case Study of Shipping Ports 389
Anshul Balamwar, Tuhin Subhra De, Debabrata Das, Manoj Kumar Tiwari

Demand Forecasting of a Multinational Retail Company Using Deep Learning Frameworks 395
Priyam Saha, Nitesh Gudheniya, Rony Mitra, Dyutimoy Das, Manoj K. Tiwari

AI-Powered Cyberinfrastructure Platform for Modular Electric Vehicle Product Design: Conceptual Framework and Architecture 400
Ajit Sharma, Anupam Keshari, Snehal Swadhin, Ravindra S. Gokhale, Manoj Kumar Tiwari

Fraud Detection in Supply Chain with Machine Learning 406
Mahdi Seify, Mehran Sepehri, Amin Hosseini-Far, Aryana Darvish

Demand Forecasting in Hospital and ICUs Using a Modified Propagation Dynamic Model: A Novel GSEIR Approach 412
Youssef Trardi, Mohammed Al-Kharaz, Bouchra Ananou, Mustapha Ouladsine

Reactive Production Scheduling Approach Based on Inventory Availability 418
Satie Ledoux Takeda-Berger, Ícaro Romolo Sousa Agostino, Maurício Randolfo Flores Da Silva, Enzo Morosini Frazzon

Adaptive Simulation-Based Optimization for Production Scheduling: A Comparative Study 424
Djonathan Quadras, Enzo M. Frazzon, Lucio G. Mendes, Matheus C. Pires, Carlos M. T. Rodriguez

Towards a Priority Rule to Integrate Maintenance Operations into Production Schedules 430
Eike Broda, Michael Freitag

Lean and Resilience in Healthcare Supply Chain: A Mediation Analysis 436
Najla Alemsan, Guilherme Luz Tortorella

An Exact Solution Approach to the Type-II Transfer Line Balancing Problem 442
Yasin Ersin Telemeci, Meral Azizoglu

Mixed-Integer Programming for Robotic Assembly Line Balancing Considering Cross-station Task and Carbon Footprint 448
Yuchen Li, Zhaoxuan Qiao, Mingyu Li, Yang Zou

Buffer Allocation Vs. Sequencing Optimization: Which of the Two is Most Effective to Improve the Efficiency of Assembly Lines? 452
Lorenzo Tiacci

A Disassembly Line Balancing Problem with Hazardous Task Failures 458
Eda Göksoy Kalaycilar, Sakine Batun, Meral Azizoglu

A Survey on Benders Decomposition Methods Applied to Assembly Line Balancing Problems 464
Adalberto Sato Michels, Celso Gustavo Stall Sikora

Social-Economic Sustainable Vehicle Routing Problem for Local E-commerce Platforms 470
Francesco Pilati, Riccardo Tronconi

The Global Semiconductor Chip Shortage: Causes, Implications, and Potential Remedies 476
Wassen Mohammad, Adel Elomri, Laoucine Kerbache

Prescriptive Cost Analysis in Manufacturing Systems 484
Sérgio Silva, Vishad Vyas, Paulo Afonso, Bret Boris

Sharing Economy: A Systematic Review of Definitions, Drivers, Applications, Industry Status and Business Models 490
Ahmed Abdul Hadi Haqqani, Adel Elomri, Laoucine Kerbache

Cross-Skilled Workforce Allocation Supporting Self-management Practices 496
A. Rotondo, M. Barake, F. Quilligan

Evaluating Robot Bin-Picking Performance Based on Box and Blocks Test 502
Primož Bencak, Darko Hercog, Tone Lerher

Golden Zone Storage Assignment and Picking Performance: An Empirical Analysis of Manual Picker-To-parts OP Systems in Grocery Retailing 508
Dominic Loske, Jonas Koreis, Matthias Klumpp

An Optimisation Model for Minimising Totes Exchange in VLM and SBS/RS Integrated System 514
Jakob Marolt, Goran Đukic, Fabio Sgarbossa, Tone Lerher

Multi-Product Capacitated Disassembly Lot-sizing Problem with Lost Sales and Possibility of Defective Disassembly Components 520
M. Hrouga, A. Sbihi

Simulation Study of Scheduling Heuristics for Parallel Machines with Sequence-Independent Setups 526
Alexandros S. Xanthopoulos, Dimitrios E. Koulouriotis

A Hybrid Simulation/optimization Architecture for Developing a Digital Twin 532
Geoffrey Tissot, Gülgün Alpan, Fabien Mangione, Frédérique Noël

Sim-Optimization Hybrid Approach for Scheduling Randomly Deteriorating Treatment Tasks in Horticulture 538
Merouane Mazar, Belgacem Bettayeb, Nathalie Klement, M'Hammed Sahnoun, Anne Louis

Optimizing Care of Visually Impaired People in the Emergency Care Units (UPA) – A Technical Briefing Applying Lean Concept 544
J. R. S Ramos, R. D Calado, I. R. S Fausto, S. C. C. S Pinto, R. M. M. Braz

DMAIC in Improving Patient Care Processes: Replication and Lessons Learned in Context of Healthcare 549
Milena Estanislau Diniz Mansur Dos Reis, Melissa Felix De Abreu, Olavo De Oliveira Braga Neto, Luis Enrique Valdiviezo Viera, Robisom Damasceno Calado

Relevance of Fast-Track to Manage Overcrowding in Emergency Departments 555
Luis Enrique Valdiviezo Viera, Sandra Maria Do Amaral Chaves, Milena Estanislau Diniz Mansur Dos Reis, Robisom Damasceno Calado, Newton Narciso Pereira

Monitoring Patient Flow in the One Emergency Care Unit (UPA) in São Paulo Brazil 561
Newton Narciso Pereira, Patrick Fernandes Ribeiro Da Fonseca, Luis Enrique Viera, Thaís Lessa Queiroz, Robisom Damasceno Calado

Clustering Brazilian Public Emergency Healthcare Units 566
Helder Gomes Costa, Maria Helena Teixeira Da Silva, Gabriel Nascimento Santos, Andrei Bonamigo, Robisom Damasceno Calado

A Problem-Specific Branch-and-Bound Algorithm for the Protected Shortest Simple Path Problem with Must-Pass Nodes 572
Yuri Ogorodnikov, Roman Rudakov, Daniil Khachai, Michael Khachay

Using PCGTSP Algorithm for Solving Generalized Segment Continuous Cutting Problem 578
Alexander Petunin, Michael Khachay, Stanislav Ukolov, Pavel Chentsov

Experimental Evaluation of Algorithms for Packet Routing in Software Defined Network 584
Pavel Borisovsky, Anton Eremeev, Sergei Hrushev, Vadim Teplyakov

Mathematical Model of the Nuclear Fuel Refueling Mechanism of the BN-800 Reactor and Optimization of Its Operation 590
Yurii F. Dolgii, Alexander N. Sesekin, Oleg L. Tashlykov

Simulating Thermal Sheet Cutting of Figured Parts 595
Mikhail Verkhoturov, Alexandr Petunin, Galina Verkhoturova, Danil Zaripov

Improving Time Series Features Identification by Means of Convolutional Neural Networks and Recurrence Plot 601
Fernanda Strozzi, Rossella Pozzi

Demand Forecasting for Delivery Platforms by Using Neural Network 607
R. Abbate, P. Manco, M. Caterino, M. Fera, R. Macchiaroli

Inventory Management Model for Stockout Based Substitutable Products 613
Michal Koren, Yael Perlman, Matan Shnaiderman

A Queueing-Inventory System in Which Customers Can Orbit During the Service 619
Gabi Hanukov

Automatic State Matching Gaussian Process Ensemble for Wood Planer Control 625
Jean-Thomas Sexton, Michael Morin, Rémi Georges, Foroogh Abasian, Jonathan Gaudreault

A Learning Factory Framework: Challenges and Solutions for an Irish University 631
William Quinn, Victor Cionca, Kritchai Witheephanich, Cemalettin Ozturk

Grid-Responsive Smart Manufacturing: Can the Manufacturing Sector Help Incorporate Renewables? 637
Yunzhi Chen, Blake Billings, Sammy Partridge, Brittany Pruneau, Kody M. Powell

Cloud Manufacturing - An Overview of Developments in Critical Areas, Prototypes, and Future Perspectives 643
Into Jacob, Yuqian Lu, Xu Xun

PART 2

Competitive Relocation of Shortage Supply in a Distribution Network 649
Alexander Yu. Krylatov, Yulia E. Lonyagina, Anastasiya P. Raevskaya

Resource Sharing Between Suppliers for a Flexible Recovery During Disruption 655
Davoud Hosseinnezhad, Cathal Heavey, Yohanes K. Nugroho

Disruption Evaluation in End-To-end Semiconductor Supply Chains Via Interpretable Machine Learning 661
Friedrich-Maximilian Jaenichen, Christina J. Liepold, Abdelgafar Ismail, Maximilian Schiffer, Hans Ehm

COVID-19 Pandemic: Supply Chain Risk Management by Integrating Interpretive Structural Modeling and Bayesian Belief Network..... 667
Roberta Pellegrino, Barbara Gaudenzi, Abroon Qazi

Process Capability Indices Robust Based on Entropic Concepts 673
Joao Manzi, Heleno Bispo

Predicting the Moisture Content of Organic Wheat in the First Stage of Tempering..... 678
L. Parrenin, C. Danjou, B. Agard, R. Beauchemin

Preparation of Papers for IFAC Conferences & Symposia: Activity Combination and Optimization Method to Support Rapid Establishment of Product Research & Development Process 684
Lihong Qiao, Yuhu Li, Xianglong Kong, Zhicheng Huang, Peilin Shao

Towards a Comprehensive Visual Quality Inspection for Industry 4.0..... 690
Jože M. Rožanec, Patrik Zajec, Elena Trajkova, Beno Šircelj, Dunja Mladenic

Concurrent WIP and an Application to Clearing Functions for Complex Heterogenous Systems..... 696
Pierre Lemaire, Kean Dequeant, Marie-Laure Espinouse, Philippe Vialletelle

Hermit Crab Optimizer (HCO): A Novel Meta-Heuristic Algorithm..... 702
Keivan Tafakkori, Reza Tavakkoli-Moghaddam

An Analogic Supply Chain Twin 708
D. D'Urso, F. Chiacchio, S. M. Khodayee, L. Compagno

Data-Driven Analysis on Anticipatory Shipping for Pickup Point Inventory 714
Xinxin Ren, Yeming Gong, Yacine Rekik, Xianhao Xu

Improving the Tractability of SVC-Based Robust Optimization 719
Benoît Loger, Alexandre Dolgui, Fabien Lehuédé, Guillaume Massonnet

Prediction and Analysis of Seasonal Dynamic Metal Consumption Using Aggregated LightGBM - A Case Study..... 725
Arjun Balamwar, Rony Mitra, Manoj K Tiwari, Priyanka Verma

Delay Prediction to Mitigate E-Commerce Supplier Disruptions Using Voting Mechanism 731
Duhita Wani, Ritik Singh, Vivekanand B Khanapuri, Manoj Kumar Tiwari

Advances in Air Cargo Financing Using a Consortium Blockchain 737
Prajwal Yadav, Ratnesh Bhosale, Rosalin Sahoo, Vivek Khanzode, Manoj Kumar Tiwari

Designing the Drone Based End-To-end Local Supply Chain Distribution Network..... 743
Mohd Juned, Purnima Sangle, Nitesh Gudheniya, Pratik Vikrant Haldankar, Manoj Kumar Tiwari

Moving Average Smoothing for Gregory-Newton Interpolation: A Novel Approach for Short-Term Demand Forecasting..... 749
Ayman R. Mohammed, Kumail S. Hassan, Mohammad A. M. Abdel-Aal

Data-Driven Decision Process for Robust Scheduling of Remanufacturing Systems..... 755
Michael Schlecht, Sara Himmiche, Virginie Goepp, Roland De Guio, Jürgen Köbler

Digital Continuity to Improve the Performance of the Industry 4.0 761
Julien Chapelin, Lionel Steck, Alexandre Voisin, Benoît Iung, Bertrand Rose

Efficiency Comparison of Proactive Approaches to Deal with Machine Failures 767
Fernanda F. Alves, Martin G. Ravetti

Streamline 3D Simulation Model Development for Virtual Commissioning with IEC61499 773
Diego Rovere, Marco Silvestri, Giovanni Dal Maso, Hilmo Dzafic, Paolo Pedrazzoli

Determine the Efficiency Frontier of a Manufacturing Factory Through a Data-Driven Approach 779
Andrea Bosi, Alessandro Grizzetti, Marco Silvestri, Caroline Villanueva

A Comparative Study of Three NSGA Versions for the Multi-Objective Sustainable Process Plans Optimization in RMS 785
Imen Khettabi, Lyes Benyoucef, Mouhamed-Amine Boutiche

Sustainable Integrated Process Planning and Scheduling (IPPS) in RMS: Past, Present and Future 791
Zeren Zhang, Lyes Benyoucef, Ali Sialat

Facility Layout Design Through Integration of Lean Manufacturing in Industry 4.0 Context..... 798
A. Chakroun, H. Zribi, Y. Hani, A. Elmhamedi, F. Masmoudi

Sustainable Value Creation of Networked Manufacturing Enterprises: Big Data Analytics Based Methodology 804
L. Tamym, L. Benyoucef, A. Nait Sidi Moh, M. D. El Ouadghiri

Circular Transformation Pathways in the Manufacturing Industry: A Systematic Literature Review 810
Niclas-Alexander Mauss, Florian Thiemt, Johannes Fottner

Competitive Optimal Pricing of O2O On-Demand Platform with Multihoming Delivery Riders 816
Wenjie Wang, Li Jiang, Lei Xie

Bridging the Parcel Delivery Last Mile Gap in Qatar: Challenges and Enhancements..... 822
Rana Jamous, Laoucine Kerbache, Adel Al Omari

Domestic Waste Management with Io-Enabled Applications: A Case Study of the Al Rayyan, Qatar Region..... 830
Iftikhar Hussain, Adel Elomri, Laoucine Kerbache

Sustainable Container Distribution by Alternatively Fueled Vehicles Under Customer and Technical Constraints 836
Sezgi Tekil-Ergün, Erwin Pesch, Katarzyna Anna Kuzmicz

Comparing Linear and Non-Linear Modelling Approaches of Learning Effects in 2-stage Flow-shop Scheduling Problems 842
Yenny Alexandra Paredes-Astudillo, Valérie Botta-Genoulaz, Jairo R. Montoya-Torres

Disabled Employees on the Manufacturing Line: Simulations of Impact on Performance and Benefits for Companies 848
Pawel Litwin, Dario Antonelli, Dorota Stadnicka

Reciprocal Learning in Production and Logistics..... 854
Steffen Nixdorf, Minqi Zhang, Fazel Ansari, Eric H. Grosse

Aircraft Final Assembly Line Planning with Staircase Makespan and Equity Criteria..... 860
D. Lovato, R. Guillaume, C. Thierry, O. Battaïa

The Product-Mold-Machine Manufacturing Problem 866
Nelson Troncoso, Héctor Cancela, Pedro Piñeyro, Franco Quezada, Óscar C. Vásquez

Integrated Tactical Production Planning with Multi Transportation Modes and Multi Supply Sources: The Case of a Phosphate Company 872
Bassma Azzamouri, Vincent Hovelaque, Vincent Giard

Advanced Process Control Modeling from an Advanced Planning and Scheduling Perspective 878
Jeffrey D. Kelly, Brenno C. Menezes

Analysis of Production Systems with Variable Transfer Batch Size 884
Boualem Rabta

Patient Scheduling: The Case of an Iranian Cardiology Clinic 889
Hamed Samarghandi, Mehdi Behroozi

Correlation Analysis of Factors Impacting Health Product Consumption in French Hospitals 895
Denis Koala, Zakaria Yahouni, Gülgün Alpan, Djamal Si Mohand

Multidimensional Assignment Problem in the Medical Sector: A Case Study 901
Quoc Nhat Han Tran, Nhan Quy Nguyen, Lionel Amodeo, Farouk Yalaoui, Hicham Chehade

Potential of Continuing Education in Health of Improvement Practices in Urgency and Emergencies in Emergency Care Units – UPA-24h 906
Adalberto Da Cruz Lima, Christiane Lima Barbosa, Sandra Maria Do Amaral Chaves, Jackson Gonçalves Oliveira, Robisom Damasceno Calado

Lean Healthcare Applied Systematically in the Accommodation of Medical Clinic's Beds in a Medium-Sized Hospital 910
Samuel Martins Drei, Paulo Sérgio De Arruda Ignácio

A Model for Research of Transitions Among Different Care Settings in Smart Lifetime Neighbourhoods 916
Valerija Rogelj, Alenka Temeljotov Salaj

Capacity Planning for Social Infrastructure of Smart Lifetime Neighbourhoods: Social Value Approach 922
Marija Bogataj, Eneja Drobez, Valerija Rogelj, Miso Drobez, David Bogataj

Smart Age-Friendly Villages: Literature Review and Research Agenda 928
Dejan Dokl, Valerija Rogelj, David Bogataj

Ambient Intelligence Supporting Health and Social Care Services in Smart Care Settings: Literature Review and Research Agenda 934
Eneja Drobež, Marta Kavšek, Marija Bogataj, Miso Drobez

The Use of Information and Communication Technologies Affects Mental Health and Quality of Life of Older Adults During the COVID-19 Pandemic 940
Mihael Nedeljko, David Bogataj, Barbara Toplak Perovic, Boris Miha Kaucic

On the Development of a Blockchain-Implementable Intermediation Model for Digital Supply Chains 946
Andrea Grassi, Guido Guizzi, Liberatina C. Santillo, Silvestro Vespoli, Julia C. Arlinghaus

Manual Collection of Data on Disruptions: Determinants to Increase the Intention to Use 952
Stephan Breiter, Jonas Gottwald, Julia C. Arlinghaus

A Review of Blockchain Technology Application on Supply Chain Risk Management 958
Yang Hu, Pezhman Ghadimi

Recording Data on Production Disruptions: Usability and Data Quality 964
Stephan Breiter, Jonas Gottwald, Julia C. Arlinghaus

A Feasibility Study on Unmanned Aerial Vehicle Navigation and Docking for Materials Transportation in Manufacturing Systems..... 970
George-Christopher Vosniakos, Gerasimos Maltezos

Augmented Reality Tool for the Facilitation of the UAV Flight Inspection Process During Aircraft De-Icing as a Maintenance Procedure 976
Panagiotis Stavropoulos, Lydia Athanasopoulou, Alexios Papacharalampopoulos, Ioannis Kanellopoulos, Dimitris Mourtzis

Unmanned Aerial Vehicle (UAV) Manipulation Assisted by Augmented Reality (AR): The Case of a Drone 983
Dimitris Mourtzis, John Angelopoulos, Nikos Panopoulos

On the Mechanical Design of a Customized Unmanned Aerial Vehicle Transporter for Flexible Manufacturing Systems 989
George-Christopher Vosniakos, Efthymios Lekai, Gerasimos Maltezos

Case Study on the Use of Unmanned Aerial Vehicles for the Maintenance of Ocean Engineering Facilities 995
Mariusz Deja, Miroslaw Gerigk, Mieczyslaw S. Siemiatkowski

Towards Intelligent Manufacturing System Safety Strategies: Generating LockOut/TagOut Sheets by Machine Learning – A Case Study..... 1001
Victor Delpla, Kevin Chapron, Jean-Pierre Kenné, Lucas Hof

Modelling and Analysis of a Markovian Production-Inventory Network 1007
Spyros I. Vlastos, Alexandros S. Xanthopoulos, Dimitrios E. Koulouriotis

A Sustainability-Based Model for Robotic Disassembly Sequence Planning in Remanufacturing Using the Bees Algorithm 1013
Natalia Hartono, F. Javier Ramírez, D. T. Pham

EPQ Model for Hybrid Manufacturing / Remanufacturing Systems with Price Sensitive Demands 1019
Matthieu Godichaud, Lionel Amodeo

A Cloud-Aided Remanufacturing Framework to Assess the Relative Complexity..... 1025
F. Mancusi, F. Fruggiero, S. Panagou

Conoscopic Holography Feasibility for Form Error In-Situ Monitoring in Additive Manufacturing 1031
F. Peña, A. Fernández, P. Zapico, G. Valiño, J. C. Rico

A Framework for Integration of Resource Allocation and Reworking Concept into Design Optimisation Problem..... 1037
Amirhossein Khezri, Lazhar Homri, Alain Etienne, Jean-Yves Dantan, Gisela Lanza

Analysis of the Impact of Servitization, Service Design and Digitalization in Industrial Companies: An Exploratory Approach 1043
Cátia A. V. Alves, Luís Miguel D. F. Ferreira, Vanessa S. M. Magalhães

Knowledge Management in SMEs: Preliminary Ideas for a Dedicated Framework 1050
Xingyu Sima, Thierry Coudert, Laurent Geneste, Aymeric De Valroger

A Sustainable Product Design Approach Based on Data Mining of Dynamic User Demands: A Case Study on HUAWEI Mate 40 Series 1056
Fanxing Zou, Xinyu Zhu, Yuning Qian, Danni Chang

Forecasting the Amount of Recyclables Using an Improved Differential Evolution-Based Neural Network 1062
Jin Yang, Shuangshuang Dong, Haoran Zhang, Peng Jiang, Ningxin Du

Waste Electrical and Electronic Equipment Recycling with Capacity Constraints and Demand Forecast Updating 1068
Ningxin Du, Jin Yang, Meimei Zheng, Wei Weng

The Carbon Cost Influences Research on Supply Chain Network Design 1074
Bing Li, Xiang Song, Graham Wall, Xiao Liu

Optimizing the Supply of Essential Goods Under Closed-Off Management: A Case Study of COVID-19 1080
Song Zihao, Shou Juping, Luo Chunling

Bi-Objective Optimization for an Integrated Facility Location and Disassembly Line Balancing Problem 1086
Peng Hu, Feng Chu

On Local Optima Distribution in Buffer Allocation Problem for Production Line with Unreliable Machines 1092
Alexandre Dolgui, Anton Eremeev, Viatcheslav Sigaev

An Integrated Approach to Line Balancing for a Robotic Production System with the Unlimited Availability of Human Resources 1098
Haiyan Yu, Niu Can, Yongxing Wang, Shengze Wang, Wenjun Zhang

Research in Production Systems and Management: “How To” and Lessons 1104
Rakesh Nagi

A Systemic Analysis of the Impacts of Product 4.0 on the Triple Bottom-Line of Sustainability 1110
Valentina Popolo, Silvestro Vespoli, Mosè Gallo, Andrea Grassi

A Stochastic Costing Model for Manufacturing Management and Control 1116
Vishad Vyas, Paulo Afonso, Sergio Silva, Bret Boris

A Milk-Run Routing and Scheduling Model for a Smart Manufacturing System 1122
Francesco Facchini, Giorgio Mossa, Simona De Tullio

Implementation of a Remote Control and System Monitoring Via a Digital Twin on an Industrial Pilot Plant 1128
Giovanni Paolo Carlo Tancredi, Giuseppe Vignali, Eleonora Bottani

Consumer Environmental Awareness and Privatization 1134
H. Caspi, Y. Perlman

Additive Or Conventional Manufacturing for Spare Parts: Effect of Failure Rate Uncertainty on the Sourcing Option Decision 1141
Mirco Peron, Rob Basten, Nils Knofius, Francesco Lolli, Fabio Sgarbossa

On the Suitability of Insourced Additive Manufacturing for Spare Parts Management 1147
F. Lolli., A. M. Coruzzolo, M. Peron, F. Sgarbossa

Challenges and Opportunities for Implementing Additive Manufacturing Supply Chains in Circular Economy 1153
Biman Darshana Hettiarachchi, Jayani Ishara Sudusinghe, Stefan Seuring, Marcus Brandenburg

Spare Parts Management with Additive Manufacturing (AM): A Critical Review 1159
A. M. Coruzzolo, E. Balugani, R. Gamberini

Printing in the Army: Where to Locate Additive Manufacturing Capabilities in a Remote Spare Parts Supply Chain? 1165
Véronique Zijlstra, Rob Basten, Tim Julsing

Case-Based Reasoning for Home Health Care Planning Considering Unexpected Events 1171
Houyem Ben Hassen, Jihene Tounsi, Rym Ben Bachouch, Sabeur Elkosantini

Source Printer Identification with Microscopic Printing Using Deep Learning 1177
Anh-Thu Phan-Ho, Quoc-Thông Nguyen, Jérémy Patrix, Jérôme Verny

Explainable Anomaly Detection for Industrial Control System Cybersecurity 1183
Do Thu Ha, Nguyen Xuan Hoang, Nguyen Viet Hoang, Nguyen Huu Du, Kim Phuc Tran

System Configuration Models: Towards a Specialization Approach 1189
M. Mohammad Amini, T. Coudert, E. Vareilles, M. Aldanondo

Enhanced CUSUM Control Charts for Monitoring Coefficient of Variation: A Case Study in Textile Industry 1195
P. H. Tran, C. Heuchenne, S. Thomassey

Joint Preventive Maintenance and Extended Warranty Strategy for Leased Unreliable Equipment Submitted to Imperfect Repair at Failure 1201
Amel Ben Mabrouk, Anis Chelbi

A Novel Predictive Selective Maintenance Strategy Using Deep Learning and Mathematical Programming 1207
Ryan O'Neil, Claver Diallo, Abdelhakim Khatab

Selective Maintenance Optimization: A Condensed Critical Review and Future Research Directions 1213
Hamzea Al-Jabouri, Ahmed Saif, Abdelhakim Khatab, Claver Diallo, Uday Venkatadri

A Property-Based Genetic Algorithm for Order Acceptance and Scheduling with Common Due Window 1219
Ziye Zhao, Xiaohui Chen, Youjun An, Yinghe Li

Robust Job Shop Scheduling with Condition-Based Maintenance and Random Breakdowns 1225
Md Hasan Ali, Ahmed Saif, Alireza Ghasemi

Developing a Matheuristic for the Integrated Planning of a Cold Rolling Steel Plant 1231
Sebastian Wegel, Thomas Volling, Florian Sahling

Impact of Encoding and Neighborhood on Landscape Analysis for the Job Shop Scheduling Problem 1237
Israël Tsogbetse, Julien Bernard, Hervé Manier, Marie-Ange Manier

A Particle Swarm Optimization Method Based on Cost Modification Heuristic for the Multi Level Lot Sizing Problem 1243
Arnaud. Laurent, David. Lemoine

Improved Chemical Reaction Optimization for Distributed Flexible Job Shop Problem with Transportation Times 1249
Bilel Marzouki, Olfa Belkahla Driss, Khaled Ghedira

Car Sequencing Problem with Cross-Ratio Constraints: A Multi-start Parallel Local Search 1255
M. Mahmoodjanloo, A. Baboli, M. Ruhla

Multi-Objective Emergency Supply Planning: A Case Study on Sichuan Province of China 1261
Maolin Zhuo, Wenjie Yang

Predicting Relative Risk of Antimicrobial Resistance Using Machine Learning Methods 1266
Ying Wu, Peng Jiang, Shin Giek Goh, Kaifeng Yu, Karina Y. H. Gin

Redesigning Deployments of Community Hospitals with a Location-Allocation Model 1272
Maolin Zhuo, Jiacheng Li, Renshan Zhang

Improving the Availability of Australian Hospitals' Critical Medical Devices 1278
Robert Berrell, Ripon K. Chakrabortty

Integrated Lot-Sizing and Job Shop Scheduling Benefiting from Reconfigurable Machine Tools 1284
Mohammad Rohaninejad, Zdenek Hanzálek, Reza Tavakkoli-Moghaddam, Behdin Vahedi-Nouri

A Bi-Objective Model for a Stage Shop Scheduling Problem with Human-Robot Collaboration 1290
Ahmad Ghasemkhani, Reza Tavakkoli-Moghaddam, Mahdi Hamid, Mohammad Mahdi Nasiri

Designing Reconfigurable Manufacturing Systems to Minimize Power Peak 1296
Xavier Delorme, Paolo Gianessi

A MILP-Based Heuristic Approach for the Design of Multi-product Modular Reconfigurable Lines 1302
Abdelkrim R. Yelles-Chaouche, Evgeny Gurevsky, Nadjib Brahimi, Alexandre Dolgui

Can Anticipatory Supply Chain Decision Making Manage the Pandemic's Effect? a Regime Switching Game 1307
Arka Mukherjee, Anirban Ganguly, Chitresh Kumar, Priyabrata Chowdhury

PART 3

Remanufacturing Strategies for a Closed-Loop Supply Chain Considering Brand Power and Carbon Regulation 1313
Xiujuan Liu, Yong He, Ali Ahsan

Time-To-Recovery Prediction in a Disrupted Three-Echelon Supply Chain Using LSTM 1319
Mahmoud Ashraf, Amr Eltawil, Islam Ali

A Flexible Closed Loop Supply Chain Design Considering Multi-Stage Manufacturing and Queuing Based Inventory Optimization 1325
Hamed Jahani, Hadi Gholizadeh

Combined Models and Algorithms on Modern Proactive Intellectual Scheduling Under Industry 4.0 Environment 1331
B. Sokolov, V. Zakharov, A. Baranov

Storage Efficiency in a Deep-Lane AVS/RS 1337
I. Battarra, R. Accorsi, R. Manzini, S. Rubini

Integrated Production Inventory and Distribution Problem of Fertilizer Products with Additional Storage Constraints 1343
S. Belil, N. Tchernev, S. Kemmoé-Tchomté

A Robust Design Integration in Non-Traditional Unit Load Warehouses 1351
Subir Rao, Sheila Roy

A New Measure for Scattering of Stocks in E-Commerce Warehouses 1357
Nilendra S. Pawar, Subir S. Rao, Gajendra K. Adil

Two-Stage Stochastic Program for Disassembly Lot-Sizing Under Random Ordering Lead Time 1363
Ilhem Slama, Oussama Ben-Ammar, David Garcia, Alexandre Dolgui

Integrated Production and Maintenance Scheduling with Environmental and Operational Considerations 1369
Z. Chekoubi, N. Ettahiry, S. Dellagi, Wajdi Trabelsi, I. Majdouline

Fuzzy Models and Product's Quality Prediction in Converter Production 1375
Alexander F. Pashchenko

Two-Echelon Inventory Management for Sustainable Pharmaceutical Supply Chain Through Waste Reduction 1380
Shayma Romdhani, Issam Nouaouri, Jihene Tounsi, Said Gattoufi, Hamid Allaoui

Machine Learning Approach for Integrated Maintenance and Spare Parts Management Strategies 1386
A. Faker, S. Bouslikhane, Z. Hajej, S. Dellagi

Production Process Control for Aero Engine Part Manufacturing 1392
Jiaxuan Zhang, Yumin He, Zhengrong Xia

Manufacturing Process Improvement for Subcontracting Production 1398
Fang Huang, Yumin He, Wei Fan, Shanyi Jin

Sales Data Analysis of Cloud Computing Products Based on Big Data 1404
Xu Zhang, Yumin He, Lixin Pan, Zhong Yao

Measurability and Feasibility of Work in the Management of an Industrial Enterprise in a Flexible Production Environment 1410
G. Smirnova, R. Sabitov, N. Elizarova, Sh. Sabitov, N. Maximova

A Comparison of Two Sigma Point Kalman Filters for Adaptive Cross-Phase Cavity Pressure Control in Injection Molding 1416
Marko Vukovic, Sebastian Stemmler, Dirk Abel, Katharina Hornberg, Christian Hopmann

A New Data-Driven Framework to Select the Optimal Replenishment Strategy in Complex Supply Chains 1423
Roberto R. Corsini, Antonio Costa, Sergio Fichera, Josè M. Framinan

Causation Analysis for Bridge-Tunnel Hybrid Construction Accident Based on FISM-DEMATEL 1429
Fangyu Chen, Xing Wu, Yongchang Wei

Data Quality Criteria for Urban Waste Management Policy-Making Using Environment-based Design 1435
Tianyu Chen, Jiami Yang, Wenhang Du, Jinli Yao, Yong Zeng

Data-Driven Dynamical Modeling of Dairy Production Oriented to Herd Management 1441
Diego J. Rodriguez-Obando, Edwin Castro-Rincón, Angela M. Castaño-Marin, José C. Montes-Vergara, Nadia Rosero

Predicting the Wood Mean Moisture Content in a Conventional Kiln-Based Drying Process: A Data-driven Approach 1447
Mouhcine Laaroussi, Loubna Benabbou, Mustapha Ouhimmou, Foroogh Abasian, Samir Haddad

A General Robust Dynamic Bayesian Network Method for Supply Chain Disruption Risk Estimation Under Ripple Effect 1453
Ming Liu, Tao Lin, Feng Chu, Feifeng Zheng, Chengbin Chu

A Reinforcement Learning Variable Neighborhood Search for the Robust Dynamic Bayesian Network Optimization Problem Under the Supply Chain Ripple Effect 1459
Ming Liu, Hao Tang, Feng Chu, Feifeng Zheng, Chengbin Chu

Minimax Relative Regret Approach for Resilient Supply Chain Design 1465
Ming Liu, Yueyu Ding, Feng Chu, Feifeng Zheng, Chengbin Chu

Economic and Environmental Evaluations of Photovoltaic Installations for Self-Consumption in Industrial Energy Communities 1471
Hamza Gribiss, Mohammad Mohsen Aghelinejad, Farouk Yalaoui

An Overview on Olive Oil Waste Valorization Scenarios: Life Cycle Approach 1477
M. A. Keskes, A. Zouari, R. Houssin, D. Dhouib, J. Renaud

Harmonizing “Smart” Life Cycle Assessment in Manufacturing Companies: Literature Review and Preliminary Morphological Analysis 1483
Philipp Miklautsch, Mario Hoffelner, Manuel Woschank

A Collaborative Architecture to Support Circular Economy Through Digital Material Passports and Internet of Materials 1491
Luigi Panza, Giulia Bruno, Franco Lombardi

The Environmental, Economic and Social Impact of Industry 4.0 in the Food Sector: A Descriptive Literature Review. 1497
Roberta Stefanini, Giuseppe Vignali

Comparing Additive Manufacturing Processes for Distributed Manufacturing 1503
Mika Salmi

A Framework to Assess the Sustainability of Additive Manufacturing for Spare Parts 1509
Butturi Maria Angela, Marinelli Simona, Lolli Francesco

Towards a Complex Geometry Manufacturing: A Case Study on Metal 3D Printing of Topology Optimised Bicycle Parts with Lattices 1515
Tajudeen A. Sulaymon, Helo T. Petri, Toshev Rayko

Mathematical Models for Minimizing Total Tardiness on Parallel Additive Manufacturing Machines 1521
Chunlong Yu, Andrea Matta, Quirico Semeraro, Junjie Lin

Intellectual Property Management Challenges of Additive Manufacturing in Replacement Part Supply Chains 1527
Kwaku Adu-Amankwa, Jonathan Corney, Athanasios Rentizelas, Andrew Wodehouse

Anomaly Detection for Compositional Data Using VSI MEWMA Control Chart 1533
Thi Thuy Van Nguyen, Cédric Heuchenne, Kim Phuc Tran

Reinforcement Learning Provides a Flexible Approach for Realistic Supply Chain Safety Stock Optimisation 1539
Edward Elson Kosasih, Alexandra Brintrup

An Experimental Study of Two Predictive Reinforcement Learning Methods and Comparison with Model-Predictive Control 1545
Dmitrii Dobriborsci, Pavel Osinenko, Wolfgang Aumer

Optimising Turning Operation in Precision Manufacturing Using Fused IoT Devices and Machine Learning Approach. 1551
I. O Olalere, O. A Olanrewaju

Forecasting Saturation in the Emergency Department: A Comparison of Queuing Data-Driven Approaches 1556
Adrien Wartelle, Farah Mourad-Chehade, Farouk Yalaoui, David Laplanche, Stéphane Sanchez

A Remaining Useful Life Model for Optimizing Maintenance Cost and Spare-Parts Replacement of Production Systems in the Context of Sustainability 1562
Mohamed-Larbi Rebaiaia, Daoud Ait-Kadi

A New Integrated Strategy for Optimizing the Maintenance Cost of Production Systems Using Reliability Importance Measures 1569
Mohamed-Larbi Rebaiaia, Daoud Ait-Kadi

Development of a Flexible Predictive Maintenance System in the Context of Industry 4.0 1576
Vincent Ciancio, Lazhar Homri, Jean-Yves Dantan, Ali Siadat, Philippe Convain

Anomaly Detection Method of Aircraft System Using Multivariate Time Series Clustering and Classification Techniques 1582
Mohamed Ben Slimene, Mohamed-Salah Ouali

Maintenance Activities Optimization Via Modelling Dedicated to Manufacturing-Distribution Systems: Selected Case Studies Discussion 1588
Janusz Szpytko, Yorlandys Salgado Duarte, Yolainys Salgado Duarte

Iterated Greedy Algorithms for Customer Order Scheduling with Dedicated Machines 1594
Julius Hoffmann, Janis S. Neufeld, Udo Buscher

Tacit Knowledge in Production Sequencing: A Seq2Seq-LSTM Approach 1600
A. Dupuis, C Dadouchi, B. Agard

Hybrid F-SWARA and F-ENTROPY for the Optimization of the Weighting of the Location Criteria of a Green Logistics Platform 1606
M. Bennani, F. Jawab, Y. Hani, A. El Mhamedi, D. Amegouz

A Matheuristic Based on Ant Colony System for the Combined Flexible Jobshop Scheduling and Vehicle Routing Problem 1613
William Torres-Tapia, Jairo R. Montoya-Torres, José Ruiz-Meza, Sana Belmokhtar-Berraf

Uncapacitated (Facility) Location Problem: A Hybrid Genetic-Tabu Search Approach 1619
Bahram Alidaee, Haibo Wang

A Rolling-Horizon Approach for a Surgery Case Scheduling Problem with Sterilizing Constraints 1625
H. Al Hasan, C. Guéret, D. Lemoine, D. Rivreau

A Review of Approaches in the Development of Risk Stratification Models for Diabetic Patients at Risk of Vascular Complications 1631
Hamzah Osop, Hai-Yan Xu, Xiuju Fu

Multi-Objective Simulation-Based Optimization for Effective Management of the Outpatient Chemotherapy Process 1639
Majed Hadid, Adel Elomri, Oualid Jouini, Laoucine Kerbache, Anas Hamad

An Anomaly Detection Method for Metro Signal and Control Systems 1645
Yibin Huang, Ken Yat Hung Li, Cheng Pei, Lei Wang, Jingliang Chen

Conceptual Design of Intelligent Platform for Non-Invasive Thermal Discomfort Detection 1651
Alla Marchenko, Alenka Temeljotov-Salaj

A Simulated Annealing Approach for Optimizing Layout Design of Reconfigurable Manufacturing System Based on the Workstation Properties 1657
Jb. Clarion, J. François, I. Grebennik, R. Dupas

Toward Scalability Evaluation of Multi-Model Lines 1663
Xavier Delorme, Audrey Cerqueus

Investigating Sustainable Manufacturing Practices in Relation to Manufacturing Strategy Context of a Firm 1669
Bhavya Pande, Gajendra Kumar Adil

Serious Game as Learning Media for Reconfigurable Manufacturing System: A Model Development 1675
Silmi Aprilia Andari, Olivier Cardin, Pascal Berruet, Romadhani Ardi

State Space Representation to Evaluate System Scalability in a Reconfigurable Manufacturing Environment 1681
Abdelhak Dahmani, Lyes Benyoucef

Design a Sustainable Supply Chain for the Textile and Clothing Industry with Consideration of Carbon Emissions 1687
Eric Papain Mezatio, Mohammad Mohsen Aghelinejad, Lionel Amodeo, Isabelle Ferreira

Using Knowledge Graphs and Human-Centric Artificial Intelligence for Reconfigurable Supply Chains: A Research Framework 1693
Benjamin Rolf, Nasser Mebarki, Sebastian Lang, Tobias Reggelin, Alexandre Dolgui

The Response of an OEM to Supply Chain Disruptions: Application of Chaos Theory 1699
Sofia Mota, José Crispim

Lifecycle Traceability Towards Sustainable and Circular Value Chains: Analysis Framework and State of the Art in the Fashion Industry 1705
Riemens Joséphine, Lemieux Andrée-Anne, Lamouri Samir

Optimal Sustainability Efforts and Pricing Policies in a Two-Echelon Supply Chain 1711
Pouneh Arbabiun, Anshuman Chutani, Anne Touboulic

An Economic Fault-Tolerant Transportation Strategy for Multiple Assembly Station Systems 1716
Marcin Witczak, Lothar Seybold, Bogdan Lipiec, Christophe Aubrun, Marcin Mrugalski

Human-Centred Assembly and Disassembly Systems: A Survey on Technologies, Ergonomic, Productivity and Optimisation 1722
Rim Slama, Oussama Ben-Ammar, Houda Tlahig, Ilhem Slama, Pierre Slangen

A Skill-Based MILP Model in Cellular Manufacturing Systems with Human-Robot Collaboration 1728
Busra Nur Yetkin, Berna Haktanirlar Ulutas

Minimising Workers' Workload in Partially Automated Assembly Lines with Human-Robot Collaboration 1734
Imre Dimény, Tamás Koltai

Modeling and Simulation of Human Behavior Impact on Production Throughput 1740
Nourddine Bouaziz, Belgacem Bettayeb, M'Hammed Sahnoun, Adnan Yassine, Ameur Latreche

An Optimal Production, Maintenance and Quality Problem, with Improved Statistical Process Chart of a Supply Chain Under Service and Quality Requirements 1746
Aminu Sahabi Abubakar, Hajej Zied, Aime C. Nyoungue

Optimization of Production Batches in a Circular Supply Chain Under Uncertainty 1752
Yasmine Morjéne, Nadia Ndhaief, Nidhal Rezg

Pricing and Remanufacturing Decisions in a Dual Channel Reverse Supply Chain: Study of Three Configurations with After Sales Services 1758
Hamzaoui Ahmed Farouk, Turki Sadok, Rezg Nidhal

Simulation and Optimisation of a Failure-Prone Disassembly-Reconditioning-Assembly System 1764
Sadok Turki, Oussama Ben-Ammar, Ilhem Slama, Nidhal Rezg, Alexandre Dolgui

Optimal Management of Production, Maintenance, and Logistic Activities in Multi-Site Environments 1769
Kamar Diaz, Mohamed Ali Kammoun, Zied Hajej, Naoufal Sefiani, Maria Francesca Milazzo

Digital Predictive Twins for Virtual Stability Analyzers 1775
Natalia N. Bakhtadze, Igor B. Yadykin, Evgeny M. Maximov

Design and Features of Advanced Decision Support Systems 1781
Elena Jharko, Ekaterina Abdulova, Kirill Chernyshov

Team Project Process Oriented on Acquiring Competence in an Open Distance Learning System 1787
Irina Nikitina, Oleg Zaikin, Andrzej Zylawski

Profit Optimization with a Power-Law Adjustable Coefficient for Zero Ending Inventories Dynamic Pricing Model, Stochastic Demand, and Fixed Lifetime Product 1793
Anna V. Kitaeva, Natalia V. Stepanova, Oleg I. Zhukovskiy

Preemptive Demand and Capacity Sharing Learning Protocols Using Long Short-Term Memory (LSTM) Neural Network Autoencoders 1798
Praditya Ajidarma, Shimon Y. Nof, Raditya A. Pradana, Wirawan A. Nugroho, Abdul H. Halim

Multi-Criteria Prioritization of Asset Management Investments in the Power Industry 1804
Gabrielle Biard, Georges Abdul-Nour, Dragan Komljenovic, Stéphane Pelletier

Multicriteria Analysis by PROMETHEE-SAPEVO-M1 Method: Choice of Brazilian Sugar and Ethanol Plants for Biomethane Production 1810
Wallace L. T. Costa, Igor P. A. Costa, Adilson V. Terra, Miguel Â. L. Moreira, Marcos Santos

Multi-Criteria Decision Making in a Multi-Method Framework with Application in Capability Acquisition and Enhancement 1816
Lily McIvor, Ripon K. Chakrabortty

Multi-Objective Inventory Optimization Problem for a Sustainable Food Supply Network Under Lateral Inventory Share Policy 1822
Banu Y. Ekren, Ritwika Chattopadhyay, Vikas Kumar

A Catalogue of Digital Solution Areas for Logistics SMEs 1828
Jaime Macias-Aguayo, Duncan McFarlane, Benjamin Schönfuß, Liz Salter

Blockchain Adoption for SMEs: Opportunities and Challenges 1834
Y. Idel Mahjoub, M. Hassoun, D. Trentesaux

A Case Study: Digitalization of Business Processes of SMEs with Low-Code Method 1840
Z. Cai, Y. Huang, S. Kessler, J. Fottner

Adoption of Advanced Technologies in Industrial Clusters. A Study in Latin American Industries 1846
Oscar D. Quiroga

Service Based Approach to Asset Administration Shell for Controlling Testing Processes in Manufacturing 1852
Hamood Ur Rehman, Jack C. Chaplin, Leszek Zarzycki, Fan Mo, Svetan Ratchev

Development of a Semi-Structured Questionnaire to Analyse Supply Chain Resilience in the post-COVID Business Era 1858
G. Marcucci, R. Sanchis, F. Ciarapica, M. Bevilacqua

Impact of Predicting Disruptive Events in Supply Planning for Enterprise Resilience 1864
Marco Arias-Vargas, Raquel Sanchis, Raúl Poler

Resilient Roadmap to Minimise the Impact of COVID-19 in the Spanish Enterprises 1870
Raquel Sanchis, Tania Cruz-Valdivieso, Giulio Marcucci, Raul Poler

Analyzing the Effects of Covid-19 on Food Supply Chains: A Case Study on Ranking the Obstacles with ANP Methodology 1876
Behdad Esfahani, Alireza Asadaraghi, Shokraneh K. Moghaddam

Modeling Perishability in MIT Beer Game Business Simulator 1882
Maxim Rozhkov, Nataliya Alyamovskaya, Tamara Levina

A Digital-Twin Based Worker's Work Allocation Framework for a Collaborative Assembly System 1887
Venkata Krishna Rao Pabolu, Divya Shrivastava, Makarand S. Kulkarni

Digital Twin and Human Factors in Manufacturing and Logistics Systems: State of the Art and Future Research Directions 1893
Nicola Berti, Serena Finco

A Roadmap Towards an Automated Warehouse Digital Twin: Current Implementations and Future Developments 1899
Andrea Ferrari, Giovanni Zenezini, Carlo Rafele, Antonio Carlin

Using a Systems Approach to Model a Process Digital Twin 1906
M. C. Herkes, G. Oversluizen

Towards Learning-Enabled Digital Twin with Augmented Reality for Resilient Production Scheduling 1912
Noel P. Greis, Monica L. Nogueira, Wolfgang Rohde

Contribution to the Sustainability of the Plastics Industry in Cuba Through Lean-Green Maintenance Management 1918
Márian Pérez Pérez, Ángel T. Pérez Rodríguez, Estrella M. De La Paz Martínez

Socialization of Smart Communicative Objects in Industrial Internet of Things 1924
R. Kilani, A. Zouinkhi, E. Bajic, M. N. Abdelkrim

A Product-Driven System Approach to Generate Fast Solutions to the Job Shop Scheduling Problem. 1930
P. Sáez, C. Herrera, J. E. Pezoa

Learning Factory FleXtory: Interactive Loops Between Real and Virtual Factory Through Digital Twin 1938
I. Rasovska, I. Deniaud, F. Marmier, J.-L. Michalak

From Digital Traces to Competences 1944
K-E. Bemmami, L. Gzara, J-L. Maire, C. Courtin

Hybrid Market with Product Competition: How Should a Green Product Survive? 1950
Yumeng Zhang, Lina Zhang

Models and Measures in Theory and Practice of Manufacturing Processes 1956
Vitalii Babak, Artur Zaporozhets, Valerij Zvaritch, Leonid Scherbak, Yurii Kuts

Understanding the Enablers of Blockchain Technology Adoption in Sustainable Supply Chains: A DEMATEL-Based Analysis 1962
Maher A. N. Agi

Production Planning and Control for Sustainable Management Systems 1968
Lingxin Wang, Rosa Abbou, Catherine Da Cunha

Prescriptive Block Replacement Policy for Production Degrading Systems 1974
N. Esposito, B. Castanier, M. Giorgio

PART 4

Using Digital Twins for Inventory and Cash Management in Supply Chains 1980
Ehsan Badakhshan, Peter Ball, Ali Badakhshan

Suppliers' Corporate Social Responsibility Efforts with Greenwashing Concerns: Can Blockchain Help? 1986
Shuning Yao, Yuanyi Liu, Xiutian Shi

On the Importance of Data for Supply Chain Network Design Projects 1992
Christoph Manuel Meyer

The Interaction Between Dual Sourcing and Blockchain Adoption Under Yield Uncertainty 1998
Yang Liu, Dmitry Ivanov

New Simulation Model for Workload Analysis Addressing Occupational Stress in a Production Company 2005
Abdulrahman A. Abdelzaher, Mohamed Kharbeche

Measuring Blood Supply Chain Performance Using Monte-Carlo Simulation 2011
Nirmeen Elsayed, Raghda Taha, Mohamed Hassan

Analysis of Food Distribution Network Using Anylogistix Computational Tool 2018
Lucas Vitorino, Igor P. A. Costa, Adilson V. Terra, Afonso C. Medina, Marcos Santos

Compiling Capacitated Single-Item Lot-sizing Problem in a CostMDD 2024
Walid Khellaf, Romain Guillaume, Jacques Lamothe

Creation of a Knowledge Space by Semantically Linking Data Repository and Knowledge Management System - A Use Case from Production Engineering 2030
Tatyana Sheveleva, Max Leo Wawer, Pooya Oladazimi, Oliver Koepler, Iryna Mozgova

2-Tuple Linguistic Model-based Circular Maturity Assessment Methodology: A Case for Agriculture 2036
Deniz Uztürk, Gülçin Büyüközkan

Integration of Industry 4.0 Technologies and Knowledge Management Systems for Operational Performance Improvement 2042
Ana Paula Lista, Guilherme Luz Tortorella

Analysis of Knowledge Management and Total Quality Management Application into Tunisian Small and Medium Enterprises 2048
F. Lehyani, M. A. Keskes, A. Zouari

Development of a Collaborative Tool for Data Valorisation in SMEs 2054
A. Toumelin, B. Agard, M. Leduc

Lean 4.0: Synergies Between Lean Management Tools and Industry 4.0 Technologies 2060
Nedjwa Elafri, Jordan Tappert, Bertrand Rose, Maleh Yassine

Modeling: Integration of Lean and Technologies of Industry 4.0 for Enterprise Performance 2067
Ilse Urquia Ortega, Anne Zouggar Amrani, Bruno Vallespir

Lean 4.0: Typology of Scenarios and Case Studies to Characterize Industry 4.0 Autonomy Model 2073
Rosin Frédéric, Magnani Florian, Joblot Laurent, Pascal Forget, Lamour Samir

Industrial Plants Commissioning Procedures Using Digital Process-Oriented Architecture 2079
Daniel Luiz De Mattos Nascimento, Alessandra Brancher Roeder, Diego Calvetti, Alejandro Menés Mustelier, Flavio Ney Magno De Araújo

Centrality Measures in Supply Chain Management Research 2085
Hesham Fouad, Nazaré Rego

Optimal Dual-Channel Distribution Configuration of a Manufacturer Under Showrooming 2091
T. M. Rofin, Biswajit Mahanty, Jagan Jacob

Study on Dual-Channel Supply Chain Game Under Carbon Subsidy Policy 2097
Yi Tian, Junhai Ma, Huijiang

Analysis of Dynamic Game with Government Subsidy in the Telecommunication Industry 2103
Junhai Ma, Naicong Ning, Zongxian Wang

The Optimal Quantity Decision and Complex Analysis of Duopoly Game Under Low-Carbon Transformation 2109
Zongxian Wang, Junhai Ma

Shifting Method for Identification of TITO Systems Using Decentralized Relay Feedback 2115
M. Hofreiter

Manufacturing-Remanufacturing Systems with Uncertain Return: Production Control with Estimation-in-the-loop..... 2121
Vladimir Polotski

The Simple Method to Recognize Similar Numerical Strings for the GNSS-Positioning⋆..... 2127
Alexander V. Smaglichenko, Tatyana A. Smaglichenko

Development of Methods for Identifying Nonlinear Stochastic Systems According to Information-Theoretic Criteria Based on Symmetric Measures of Divergence and Taking into Account Quantitative Characteristics of Identifiability 2132
Kirill R. Chernyshov, Elena Ph Jharko, Ekaterina A. Abdulova

Distribution of Non-Uniform Complex of Resources in Production Systems..... 2138
Dmitry Kononov, Meran Furugyan

Dynamic Selection of Priority Rules Based on Deep Reinforcement Learning for Rescheduling of RCPSP..... 2144
Teng Wang, Wei Cheng, Yahui Zhang, Xiaofeng Hu

An Adaptive Threshold Strategy Based on Genetic Optimization for Nonlinear Dynamic Process Monitoring..... 2150
Yan-Ning Sun, Hong-Wei Xu, Wei Qin

Unified Model Towards Service-Oriented Continuous-discrete Hybrid Adaptive Milling System for Thin-walled Parts Driven by In-process Data 2156
Xiong Zhao, Lianyu Zheng, Maoyuan Shi, Yiwei Wang

An Improved XGBoost Prediction Model for Multi-Batch Wafer Yield in Semiconductor Manufacturing 2162
Hong-Wei Xu, Wei Qin, Yan-Ning Sun

A Matheuristic Approach to the Open Shop Scheduling Problem with Sequence-Dependent Setup Times..... 2167
Erica Pastore, Arianna Alfieri, Claudio Castiglione, Gaia Nicosia, Fabio Salassa

Polynomial-Size Models to Minimize Total Completion Time in a Parallel Batching Environment..... 2173
Alessandro Druetto, Andrea Grosso

Scheduling Unrelated Parallel Machines with a Common Server and Sequence Dependent Setup Times..... 2179
Houda Raboudi, Gülgün Alpan, Fabien Mangione, Geoffrey Tissot, Frédéric Noel

Computing Fair Solutions in Single Machine Scheduling..... 2185
Matteo Cosmi, Gaia Nicosia, Andrea Pacifici

Minimizing Total Weighted Completion Times for Semi-Online Single Machine Scheduling..... 2191
H. Nouinou, T. Arbaoui, A. Yalaoui

Business Continuity Management as a Key Enabler of Supply Chain Resilience: A Conceptual Paper..... 2197
G. Riglietti

Pharmaceutical Supply Chain Risk Assessment During COVID-19 Epidemic 2203
W. Daoud Benamor, A. Labella, H. Moalla Frikha, L. Martínez López

Business Continuity Training: Educational Programme Proposal 2209
Raquel Sanchis, Giulio Marcucci, Raul Poler, Filippo Emanuele Ciarapica

Simulating the COVID19-Pandemic and Its Impact on the Semiconductor Supply Chain: Enabling a Supply Chain Risk Management Framework 2215
Mukai Mahachi, Honoré Moukala, Abdelgafar Ismail, Anna Hopf, Hans Ehm

Framework for Planning and Implementation of Digital Process Twins in the Field of Internal Logistics 2221
Pascal Zuhr, Lukas Rissmann, Sebastian Meißner

New Heuristics for Assigning in the Multi-Depot Vehicle Routing Problem 2228
Isis Torres-Pérez, Alejandro Rosete, Guillermo Sosa-Gómez, Omar Rojas

Monitoring of Shop-Floor Workers Postural Stability Through the Use of Smart Soles 2234
Diogo Teixeira, José Ferreira, Ricardo Gonçalves

AI-Based Improvement of Decision-makers' Knowledge in Production Planning and Control 2240
Felix Franke, Susanne Franke, Ralph Riedel

Architecture for Preventing and Detecting Cyber Attacks in Cyber-Manufacturing System 2246
Romesh Prasad, Young Moon

Resilience Enhancing Mechanisms for Cyber-Manufacturing Systems Against Cyber-Attacks 2252
Carlos Espinoza-Zelaya, Young Bai Moon

Towards a Framework to Position Resilience and Industry 4.0 2258
Virginie Goepp, Lamia Berrah, Emna Drira, Sondes Chaabane

Evaluation of Operational Resilience in Cyber-Physical Production Systems: Literature Review 2264
Ali Attajer, Sondes Chaabane, Saber Darmoul, Yves Sallez, Fouad Riane

Customer Order Scheduling in a Mobile 3D Printing Factory 2270
Eduardo Alarcon-Gerbier, Benedikt Zipfel, Udo Buscher

Mixed Integer Linear Programming Model for Open Pit Mine Scheduling 2276
S. Aallaoui, A. Azzamouri, N. Tchernev

Continuous Time and Volume Batch Formulation for the Multiproduct Pipeline Network Scheduling Problem 2282
Meryem Bamoumen, Selwa Elfirdoussi, Libo Ren, Nikolay Tchernev

Threat Elimination Algorithm for Dual Resource Constrained Flexible Job Shop Scheduling Problems 2288
Ricardo Magalhães, Susana Vieira, João Sousa

Materials Flow Control in Multi-Cell Manufacturing Systems: The C-CONWIP System 2294
S. Carmo-Silva, Matthias Thürer, Fernando J. Gómez, Moacir Godinho Filho, Nuno O. Fernandes

Investigation of Ductile/brittle Chip Formation Zone in the Context of Manufactured Geometry with Different CAM Paths Strategies 2300
László Móricz, Zsolt Viharos János

Digital Factory to Support Deadlines Prediction in Small Volume Production 2306
M. Debevec, M. Simic, N. Herakovic

An Approach for AI-Based Forecasting of Maintenance Orders for MRO Scheduling 2312
Florian Öhlinger, Lisa Greimel, Robert Glawar, Wilfried Sihn

Maintenance-Free Factory: A Holistic Approach for Enabling Sustainable Production Management 2318
Robert Glawar, Fazel Ansari, Luisa Reichsthaler, Wilfried Sihn, Daniel Toth

The Application of Supply Chain Digital Twin to Measure Optimal Inventory Policy 2324
Pratik Maheshwari, Suchet Kamble

Integrated Resource Management in the Digital Ecosystem of the Enterprise Based on Intelligent Consorts 2330
Dmitry Novikov, Natalya Bakhtadze, Denis Elpashev, Alexander Suleykin

A Cold Chain Logistics with IoT and Blockchain Scalable Project for SMEs: First Phase 2336
Cristina Ramírez, Alix E. Rojas, Alexander García

Towards a Smart Connector for Dynamic Interoperability in Agile Enterprises 2342
F. Belkadi, J. Vieille, B. Tanous

Qualitative Analyses of Semantic Interoperability Approaches: Toward Learning Based Model Transformations 2348
Q. Brilhault, E. Yahia, L. Roucoules

Data Model Classification for Interoperability in the Industry 2354
Y. Chen, D. Annebicque, V. Carre-Menetrier, A. Philippot, T. Daneau

Refund Policy and Threat of Encroachment with Consumer Behaviors 2360
Baoli Shi, Qi Xu, Zhongmiao Sun

Prices and Profits in Centralized Dual-Channel Supply Chains Under Competition 2366
Ranjit B. Nair, K. P. Abijith, Anand Abraham, K. Ratna Kumar, R. Sridharan

Integrated Lot-Sizing and Pricing Problem Under Cross-price Demand Model 2372
Mourad Terzi, Alice Yalaoui, Yassine Ouazene, Farouk Yalaoui

The Development of the Market Structure of Heterogeneous Firms 2378
Arunas Burinskas, Aurelija Burinskiene

The Dynamics of Customer Satisfaction Dimension Based on BERT, SHAP, and Kano Model 2384
Hyunwoo Park, Hyunju Jeon

Building Resilience and Innovation Through Intelligent Diverse Supplier Engagement 2390
Yingli Wang, Jean-Paul Skeete, John Barker, Maxim Filimonov

A Framework Based on Blockchain, Artificial Intelligence, and Big Data Analytics to Leverage Supply Chain Resilience Considering the COVID-19 2396
Samuel Fosso Wamba, Maciel M. Queiroz

Blockchain and Trust in Supply Chain Management: A Conceptual Framework 2402
Rami Alkhudary, Pierre Féniès

NIndustry 4.0 Technologies in Maternal Healthcare: A Systematic Review 2407
Khulekani Sibanda, Patrick Ndayizigamiye, Hossana Twinomurinzi

International Journal of Production Research Over the Past 25 Years: A Retrospective Bibliometric Analysis 2413
D. Ciric Lalic, U. Marjanovic, B. Lalic, M. Savkovic, T. Lolic

Analysis of the Impact of Lean and Green Practices in Manufacturing Companies: An Exploratory Study 2419
Teresa B. A. Ribeiro, Luís Miguel D. F. Ferreira, Vanessa S. M. Magalhães, Susana Garrido Azevedo

Research Trends in Clean, Green and Sustainable Manufacturing: A Bibliometric Review 2425
M. Caterino, M. Rinaldi, M. Fera, R. Macchiaroli, E. Bottani

IFAC MIM 2022 Conference: How to Prepare Students for an Agile Professional Life 2431
Carsten Stechert, Hans-Patrick Balzerkiewitz

Development and Proposal of a LARG (lean, Agile, Resilient, Green) Performance Measurement System for a Food Supply Chain 2437
Eleonora Bottani, Barbara Bigliardi, Marta Rinaldi

Assessing Lean, Green and Supply Chain's Sustainable Performance: Perspectives from Academia and Industry 2445
Ali Hebaz, Salah Oulfarsi, Ikram Ait Hammou, Abdelhak Sahib Eddine

Analytical Estimation of Interaction Force and Its Application Point for Collaborative Robots 2451
Dmitry Popov, Alexandr Klimchik, Anatol Pashkevich

Assembly Sequence Planning with Deformable Linear Objects in the Smart Factory: Dilemmas and Injections 2457
Ran Shneor, Sigal Berman

Development of an Affordable and Auto-Reconfigurable Solution for Small Box Assembly 2463
Z. Wang, P. Kendall K. Gumma A. Smith, A. Turner S. Ratchev

Planar Shape Control of Deformable Linear Objects 2469
Karam Almaghout, Alexandr Klimchik

On Smooth Planar Curvilinear Motion of Cable-Driven Parallel Robot End-effector 2475
Eugene A. Marchuk, Yaroslav V. Kalinin, Alexander V. Maloletov

A New Stochastic Bi-Level Optimization Model for Post-disaster Relief Scheduling Problem in Sustainable Humanitarian Supply Chains with Uncertain Relief Supplies and Demands 2481
Ming Liu, Tao Lin, Feng Chu, Feifeng Zheng, Chengbin Chu

Exact Methods for Tardiness Objectives in Production Scheduling 2487
Ioannis Avgerinos, Ioannis Mourtos, Stavros Vatikiotis, Georgios Zois

Job Shop Scheduling: A Novel DRL Approach for Continuous Schedule-Generation Facing Real-time Job Arrivals 2493
Nour El Houda Hammami, Benoit Lardeux, Atidel B. Hadj-Alouane, Maher Jridi

Towards Digital Supply Chain Risk Surveillance 2499
Edward Kosasih, Alexandra Brintrup

It Project Management: Supply Chain Optimization for Service Operations 2505
Alexey Yu. Zalozhnev, Denis V. Peremezhko

Dynamical Analysis of (r, Q) Inventory Policy in Multi-Modal Distribution Systems with Uncertain Goods Delivery Time 2509
Przemyslaw Ignaciuk

Joint Optimization of Safety Stock Placement and Supplier Selection in a Multi-Layered Distribution Network 2515
Cheshmeh Chamani, Casper Van Gheluwe, El-Houssaine Aghezzaf

Visibility Model for Enhancing Supply Chains Resilience 2521
Ingra Viel De Farias, Silvio Luiz Dos Santos Alvim, Davi De Simas, Enzo Morosini Frazzon

Associative Rules-Driven Intelligent Production Schedule Control System for Digital Manufacturing Ecosystem 2526
Alexander Suleykin, Natalya Bakhtadze, Denis Elpashev, Valery Pyatetsky

Asset Administration Shell in Manufacturing: Applications and Relationship with Digital Twin 2533
Tasnim A. Abdel-Aty, Elisa Negri, Simone Galparoli

Clearing Function-Based Simulation Optimization for Release Planning Under Digital Twin Wafer Fabs 2539
Zhengmin Zhang, Gong Yeming, Guan Zailin

Integration of Artificial Intelligence in the Life Cycle of Industrial Digital Twins 2545
Farah Abdoune, Maroua Nouiri, Olivier Cardin, Pierre Castagna

Key Research Challenges in Digital Twin Applications for Demanufacturing 2551
Farah A. Abumadi, Concetta Semeraro, Abdul Ghani Olabi, Michele Dassisti

Comparison of Mathematical Programming Models for Optimization of Transshipment Point Seaport - Railway 2557
Egor Grishin, Nikolay Pravdivets, Nikolai Morozov, Alexander Lazarev, Ilia Tyulenev

A MILP Approach for Detailed Pipeline Scheduling and Storage Management Problem in the Phosphate Industry 2563
M. Sidki, N. Tchernev, S. Elfirdoussi

Approaches to Solving the Problem for Increasing the Capacity of Operating Rooms 2569
Alexander A. Lazarev, Darya V. Lemtyuzhnikova, Mikhail L. Somov

Two Heuristics for One of Bin-Packing Problems 2575
Barashov Egor, Grishin Egor, Lemtuzhnikova Daria

Large-Scale Discrete-Time Scheduling Optimization: Industrial-Size Applications 2581
Robert E. Franzoi, Brenno C. Menezes

A Two-Level Optimization Approach for Engineer-To-Order Project Scheduling 2587
Anas Neumann, Adnene Hajji, Monia Rekik, Robert Pellerin

A Didactic Review on Genetic Algorithms for Industrial Planning and Scheduling Problems 2593
Anas Neumann, Adnene Hajji, Monia Rekik, Robert Pellerin

Parallel Identical Machines Scheduling to Minimize the Maximum Inter-Completion Time with Uncertain Processing Time 2599
Yang Sui, Zhaojie Wang

Integrated Prescriptive Maintenance and Production Planning: A Machine Learning Approach for the Development of an Autonomous Decision Support Agent 2605
Mohaiad Elbasheer, Francesco Longo, Giovanni Mirabelli, Antonio Padovano, Simone Talarico

Study of Protection Mechanism of on Time Delivery with Smart Production Control System in Industry 4.0 2611
Hong Chen

Assessing the Potential of Decentralised Scheduling: An Experimental Study for the Job Shop Case 2617
Jose M Framinan, Paz Perez-Gonzalez, Victor Fernandez-Viagas, Victoria Gonzalez

Engineering Data Treasures, Their Collection and Use 2623
Arndt Lüder, Kristof Meixner, Stefan Biffl

Applied Machine Learning for Production Planning and Control: Overview and Potentials 2629
Konstantin Büttner, Oliver Antons, Julia C. Arlinghaus

Assessment of Performance in Industry 4.0 Enabled Job-Shop with a Due-date Based Dispatching Rule 2635
Emma Salatiello, Guido Guizzi, Maria Grazia Marchesano, Liberatina Carmela Santillo

Human-Centricity in the Design of Production Planning and Control Systems: A First Approach Towards Industry 5.0 2641
Patrick Rannertshauser, Melanie Kessler, Julia C. Arlinghaus

PART 5

ROBxTASK RTE - A Lightweight Runtime Environment to Implement Collaborative Processes Across Different Robotic Systems 2647
Helmut Zörrer, Matthias Propst, Georg Weichhart, Andreas Pichler, Mathias Schmoigl-Tonis

A Nonlinear Discrete-Time Sliding Mode Controller for Autonomous Navigation of an Aerial Vehicle Using Hector SLAM 2653
Aydin Can, Joshua Price, Allahyar Montazeri

Distributed Robust Synchronization Control of Multiple Heterogeneous Quadcopters with an Active Virtual Leader 2659
Imil Hamda Imran, Allahyar Montazeri

Adaptive Integral Terminal Sliding Mode Control for the Nonlinear Active Vehicle Suspension System Under External Disturbances and Uncertainties 2665
Hamid Ghadiri, Allahyar Montazeri

A Dynamic Programming Approach for Batch Cycle Time Optimization in Hot Metal Forming 2671
Nuria Nievas, Adela Pagès-Bernaus, Francesc Bonada, Llúis Echeverria, Albert Abio

Analysis of a JIT Stochastic Inventory System for Deteriorating Items 2677
Freddy A. Pérez, Torres Fidel, Amaya Ciro

Inventory Management of Vertically Differentiated Perishable Products with Stock-Out Based Substitution 2683
Daniele Giovanni Gioia, Leonardo Kanashiro Felizardo, Paolo Brandimarte

Production Policy Optimization in the Systems with Perishable Products Under Seasonal Demand 2689
Vladimir Polotski

Optimizing Product Assortment, Joint Replenishments, and Storage Capacity Allocation in a Deteriorating Inventory System 2695
Davide Castellano, Mosè Gallo, Andrea Grassi, Liberatina C. Santillo

Location Advantages of the Container Port for Perishable Goods in the Murcia Region 2701
David Bogataj, Marija Bogataj, Francisco Campuzano-Bolarin, José Andrés Moreno Nicolás

Ontology-Based Collaborative Assembly in the Low-Volume High-Variability Manufacturing 2707
Nikolai Kazantsev, Iain Duncan Stalker, Nikolay Mehandjiev, Pedro Sampaio

Integrated Simulation-Optimization Modeling Framework of Resilient Design and Planning of Supply Chain Networks 2713
Dmitry Ivanov, Alexandre Dolgui, Boris Sokolov, Marina Ivanova

The Role of Industrial Resources in Reconfigurable Aerospace Production Systems: A Preliminary Literature Review 2719
Rebeca Arista, Fernando Mas, Domingo Morales-Palma, Manuel Oliva, Carpoforo Vallellano

Detecting Failure of a Material Handling System Through a Cognitive Twin 2725
R. D. D'Amico, A. Sarkar, H. Karray, S. Addepalli, J. A. Erkoyuncu

Capacitated Stochastic Lot-Sizing and Production Planning Problem Under Demand Uncertainty 2731
Seyed Amin Seyfi, Görkem Yilmaz, Ihsan Yanikoglu, Alpaslan Garip

On the Inventory Performance of Demand Forecasting Methods of Medical Items in Humanitarian Operations 2737
Bahman Rostami-Tabar, Marwa Hasni, M. Zied Babai

Digital Twin for Inventory Planning of Fresh Produce 2743
Tsega Y. Melesse, Matteo Bollo, Valentina Di Pasquale, Stefano Riemma

Supply Planning and Inventory Control Under Lead Time Uncertainty: A Literature Review and Future Directions 2749
O. Ben-Ammar, A. Dolgui, F. Hnaien, M.-A. Ould-Louly

Inventory Control in Supply Chain: A Model-Free Approach 2755
Danielle Nyakam Nya, Samir Hachour, Hassane Abouaissa

The Newsvendor Problem with a Non-Stationary Demand Process and Exact Accounting of Holding Costs 2761
Ahiad Miness, Tal Avinadav

Inventory Management: Bi-Objective Optimization Models for Mass Customization 2767
Hernandez-Ruiz Kenneth E, Gonzalez-Tamayo Lizbeth A

A Supplier Selection Decision Model Using Multi-Criteria Decision Analysis in a Small Manufacturing Company 2773
Márcio Rodrigues, Eva Šírová, Godfrey Mugurusi

A Review on Collaborative Robot Assembly Line Balancing Problems 2779
M. Kheirabadi, S. Keivanpour, Y. Chinniah, J. M. Frayret

Experimental Study on Robot Calibration Approaches. 2785
Pavel Kozlov, Alexandr Klimchik

Interactive Industrial Robot Programming Based on Mixed Reality and Full Hand Tracking 2791
Mikhail Ostanin, Stanislav Zaitsev, Adelia Sabirova, Alexandr Klimchik

Dynamic Modelling and Control of a Luxury Arts and Crafts Product. 2797
Mathieu Porez, Victorien Ferré

Discrete-Time Adaptive Control of Pneumatic Actuators for 6-DoF Stewart Platform 2803
Nikolay V. Kuznetsov, Boris Andrievsky, Iuliia Zaitceva, Elena V. Kudryashova, Olga A. Kuznetsova

Simultaneously Updating Multiple Performance Measures of Manufacturing Systems After Scheduling Perturbations 2809
Golshan Madraki, Seyedamirabbas Mousavian

Intelligent Decision Support System Based on Video Recognition of Tuyere Hearth in a Blast Furnace 2815
Natalia Bakhtadze, Vitaly A. Beginjuk, Denis V. Elpashev, Eddy A. Zakharov, Alexey Chereshko

A Mathematical Programming Approach for Optimizing On-Specs Production for Industrial Processes Under Input Uncertainty 2822
Pavlos Eirinakis, Gregory Koronakos

Closed-Loop Inventory Routing Problem for Perishable Food with Multi-type Returnable Transport Items 2828
Yipei Zhang, Feng Chu, Ada Che

Interpretable Machine Learning to Improve Supply Chain Resilience, an Industry 4.0 Recipe 2834
Sadeq Heydarbakian, Mehran Spehri

A Methodological Framework for Efficient and Resilient Supply Network Design 2840
Riccardo Aldrighetti, Martina Calzavara, Ilenia Zennaro, Daria Battini, Dmitry Ivanov

Lean and Legacy Supply Chains for Coordinated Demand Driven Production to Handle Disruptions 2846
Venkataramaniah Saddikutti, Pavan Kumar Gudavalleti, Mahendra Pal Singh

Application of Analytics to Achieve Supply Chain Resilience 2852
Morris A. Cohen

The Effect of Complexity on the Resilience and Efficiency of Integrated Healthcare Systems: The Moderating Role of Big Data Analytics 2857
Valeria Zaza, Maddalena Bisceglie, Silvana Valerio, Ilaria Giannoccaro

Simulating the Network Structures in the Circular Economy and Their Impact on Resilience 2863
Giovanni Francesco Massari, Ilaria Giannoccaro

On the Synergetic Relationship Between Circular Economy and Resilience: Findings from a Systematic Literature Review 2869
Giovanni Francesco Massari, Alessandro Annarelli, Simonetta Primario, Gloria Puliga

A Metric Approach for the Two-Station Single-Track Railway Scheduling Problem 2875
T. C. Edwin Cheng, Alexander Lazarev, Darya Lemtyuzhnikova

A New Interpolation-Based Polynomial Algorithm for Estimating Lateness in Single Machine Scheduling Problem 2881
Alexander Lazarev, Darya Lemtyuzhnikova, Andrey Tyunyatkin, Olga Battaia

Simulation Approach for Day-Ahead Production Scheduling of a Power Plant. 2887
Ivan Nekrasov, Nikolay Pravdivets

Single Track Transportation in a Two-Machine Production System 2893
Yakov Zinder, Alexander Lazarev, Elena Musatova

Analysis of the Feasibility to Use Metric Approach for NP-Hard Makespan Minimization Problem 2898
E. Bukueva, I. Kudinov, D. Lemtyuzhnikova

Agent-Based Simulation for Vaccination Networks Design and Analysis: Preliminary Gaps..... 2902
C. Piffari, A. Lagorio, R. Pinto

Transformation of Robotics Education in the Era of Covid-19: Challenges and Opportunities..... 2908
Athanasios Christopoulos, Guido Coppo, Salvatore Andolina, Simone Lo Priore, Mikko-Jussi Laakso

A Decision Support System to Reorganize Medical Service Network in Pandemic 2914
Sajjad Ahadian, Mir Saman Pishvaee, Hamed Jahani

A Vehicle Routing Problem with Time Windows and Workload Balancing for COVID-19 Testers: A Case Study 2920
S. Shahnejat-Bushehri, A. Kermani, O. Arslan, J.-F. Cordeau, R. Jans

Reverse Supply Chain Network with Return Products Quality Consideration..... 2926
Sahar Ebrahimi Bajani, Sara Saberi, Fuminori Toyasaki

Dynamic Scheduling of a Due Date Constrained Flow Shop with Deep Reinforcement Learning..... 2932
Maria Grazia Marchesano, Guido Guizzi, Valentina Popolo, Giuseppe Converso

Analysis of Quality Issues in Production with Multi-View Coordination Assets 2938
Sebastian Kropatschek, Thorsten Steuer, Elmar Kiesling, Kristof Meixner, Stefan Biffl

A Survey of the Underlying Success Factors of Maintenance Digital Transformation..... 2944
Afef Saihi, Mohamed Ben-Daya, Rami As'Ad

Three-Faceted Manufacturing Knowledge Representation in Cloud Environments 2950
Damian Drexel, Ralph Hoch

Control of a Robot Axis with Effort Feedback..... 2956
Sofia Torres, Pierre-Philippe Robet, Yannick Aoustin, Maxime Gautier, Jorge Martins

Quadrotor Attitude and Altitude Tracking Control Using Finite Discrete-Time Linear Quadratic Tracking Controller 2962
A. M. Aghazamani, M. Khodabandeh, R. Razavi-Far, J. Zarei, M. Saif

Genetic Algorithm-Based Sliding Mode Control of a Human Arm Model..... 2968
M. R. Kheshti, A. R. Tavakolpour-Saleh, R. Razavi-Far, J. Zarei, M. Saif

Robust Formation Control and Trajectory Tracking of Multiple Quadrotors Using a Discrete-Time Sliding Mode Control Technique 2974
Aydin Can, Imil Hamda Imran, Joshua Price, Allahyar Montazeri

Simulation of Remote Manipulator Control System with Saturated Actuator 2980
Iuliia Zaitceva, Boris Andrievsky, Nikolay V. Kuznetsov, Alexander M. Popov

POLCA Vs. RF-POLCA: Performance Assessment by Simulation..... 2986
Bruno Lopes, Nuno O. Fernandes, L. Pinto Ferreira, Francisco J. G. Silva, S. Carmo-Silva

Multi-Echelon Inventory Optimization in Closed-loop Supply Chain 2992
R. Fokouop, Z. Jemai, E. Sahin, Y. Dallery

Economic Production Quantity with Inventory Rationing for a Decaying Item 2998
Davide Castellano, Christoph H. Glock

Code Generation Approach Supporting Complex System Modeling Based on Graph Pattern Matching 3004
Jie Ding, Jinzhi Lu, Guoxin Wang, Junda Ma, Yan Yan

Towards an Ontology for a Lightweight Support System for Production System Rough Planning 3010
Joachim Lentes

Ontology-Centric Industrial Requirements Validation for Aircraft Assembly System Design 3016
Xiaodu Hu, Rebeca Arista, Joachim Lentes, Jinzhi Lu, Dimitris Kiritsis

A System Dynamics Simulation on International Dual-Source Procurement Strategy Under the Influence of Tariff and Supplier Reliability 3022
Lai Xin-Feng, Wang Xin, Chen Zhi-Xiang

Variable Neighborhood Search for the Capacitated Lot Sizing Problem with Remanufacturing and Overtime 3028
Omar H. Eldalgamouny, Essam Kaoud, Mohammad A. M. Abdel-Aal

An Improved Approximate Dynamic Programming Method for the Integrated Fleet Sizing and Replenishment Planning Problem with Predetermined Delivery Frequencies 3034
Duygu Aghazadeh, Kadir Ertogral

Stochastic Production Planning with Flexible Manufacturing Systems and Uncertain Demand: A Column Generation-Based Approach 3040
Milad Elyasi, Basak Altan, Ali Ekici, Okan Örsan Özener, Ihsan Yanikoglu

Installment Payment Strategy for Online Retailer Platform Under Commercial Loan Financing 3046
Xiaoli Wu, Yaoyi Zeng, Jingyi Huang

Retailer's Optimal Ordering and Financing Policies Under Two -Level Credit Ratings 3052
Wu Xiaoli, Yang Haixin

Game Between the Third Party Payment Service Provider and Bank in Mobile Payment Market 3058
Hui Jiang, Junhai Ma, Zhaosheng Feng

Anomaly Detection Method Applied to Vehicle Monitoring 3064
P. Garcia, B. Agard, N. Saunier

An IoT-Based Maintenance Framework for Irrigation and Drainage Water Management System at Regional Scale 3070
B. Guidani, R. Accorsi, G. Lupi, R. Manzini, M. Ronzoni

Development and Validation of an Overall Equipment Efficiency Measurement Model for Supporting Operational Excellence 3076
Senevi Kiridena, Wenxu Li, Richard Dwight

Early Semiconductor Anomaly Detection Based on Multivariate Time-Series Classification Using Multilayer Perceptron 3082
Samia Mellah, Youssef Trardi, Guillaume Graton, Bouchra Ananou, Mustapha Ouladsine

A Bayesian Network Method for Humanitarian Supply Chain Performance Evaluation 3088
Lu Wang, Yueyu Ding, Yunfeng Wang

Integrated Inventory Management, Supplier Selection, Disruption Risk Assessment Problem Under Ripple Effect 3094
Ming Liu, Zhongzheng Liu, Feng Chu, Feifeng Zheng, Chengbin Chu

Prepositioning of Emergency Supplies for Predictable Disasters Using Distributionally Robust Optimization 3100
Jing Li, Ada Che, Feng Chu

Warehousing and Distribution Network Design from a Third-Party Logistics (3PL) Company Perspective 3106
Georgios Karagiannis, Ioannis Minis, Christina Arampantzi, Georgios Dikas

Assessing Interactions Between Lean Six-Sigma, Circular Economy and Industry 4.0: Toward an Integrated Perspective 3112
D. Skalli, A. Charkaoui, A. Cherrafi

Implications of Implementing Industrial Symbiosis for Supply Chain Dynamics 3118
Rebecca Fussone, Roberto Dominguez, Salvatore Cannella, Jose M. Framinan

Tracing and Measuring the COVID-19 Colombian Vaccination Network 3124
Trujillo-Diaz Johanna, Amaya Ciro, González-Uribe Catalina, Hernandez Estefania, Velasco Nubia

Mixed-Integer Linear Programming for Specialized Education and Home Care Services 3130
Mira Bou Saleh, Olivier Grunder, Amir Hajjam El Hassani

Fairness in Home Healthcare: Can Patient-Centered and Nurse-Centered Measures Concur to the Same Goals? 3136
V. Bonomi, R. Mansini, R. Zanotti

Optimal Models for Autonomous Trucks and Drones Resupply for Last-Mile Delivery in Urban Areas 3142
Zhe Yuan, Simon Herve

Designing Reverse Logistics Network for a Case Study of Home-Care Health Medical Device Waste Management: Implications for Industry 4.0 Supply Chains 3148
Kubra Sar, Pezhman Ghadimi

Green VRP Applied to Home Health Care Problem 3154
S. Hadjtaieb, Y. Hani, T. Moalla Loukil, A. El Mhamedi

New MDP Model and Learning Algorithm for Bus Scheduling Problem with Conditional Signal Priority 3160
Ming Liu, Yecheng Zhao, Feng Chu, Feifeng Zheng, Chengbin Chu

On the Emergency Water Distribution Problem: Optimizing Vehicle Routing Decisions with Deprivation Costs Considerations 3166
Nicolás Giedelmann-L, William J. Guerrero, Elyn L. Solano-Charris

Machine Learning Models for Efficient Port Terminal Operations: Case of Vessels' Arrival Times Prediction 3172
Sara El Mekkaoui, Loubna Benabbou, Abdelaziz Berrado

A Simulation-Optimization Approach for Solving the Forestry Logistics Problem 3178
Soheil Y. Sibdari, Amir H. Sepasi

Cloud Architecture-Based Multi-agent Platform for Matching in Resource Sharing 3184
Shiming Liu, Mohammad Amin Yazdani, Sophie Hennequin, Daniel Roy

Analyzing Capabilities for Resilient Supply Chain in Unexpected Event 3190
K. Echefaj, A. Charkaoui, A. Cherrafi

Optimizing Food Ordering in a Multi-Stage Catering Supply Chain Network Using Reusable Containers 3196
M. Ronzoni, R. Accorsi, I. Battarra, B. Guidani, S. Rubini

Methodology for the Selection of S^3 Solutions in Manufacturing Processes: Leak Test Study in the Automotive Sector 3202
Cortés Daniel, Ramírez José, González Emilio, Puente Jaime, Molina Arturo

Multi-Level Approach to Virtual Commissioning: A Reconfigurable Assembly System Case 3208
Matthias Schamp, Thibaut Demasure, Stijn Huysentruyt, Jan Lamote, Johannes Cottyn

Requirements for Reconfiguration Management for Manufacturing Systems 3214
Birte Caesar, Dawn M. Tilbury, Kira Barton, Alexander Fay

From Automation Toward Integration of Process Planning: A State-Of-the-art Review 3220
Muhammad Ameer, Mohammed Dahane

Contributions of Industry 4.0 to Resilience Achievement in the Context of COVID-19 Pandemic 3226
Saloua Said, Hafida Bouloiz, Maryam Gallab

Towards the Ethical Awareness Integration on Industrial Performance Management Systems 3232
Jose-Fernando Jimenez, Lamia Berrah, Damien Trentesaux, Claude Chapel

Estimation of Risk Contingency Budget in Projects Using Machine Learning 3238
C. Capone, T. Narbaev

A Bi-Objective Model for the Cloud Manufacturing Configuration Design with Resilience and Disruption Risks 3244
Hamidreza Arbabi, Ali Bozorgi-Amiri, Reza Tavakkoli-Moghaddam, Mohammad Rohaninejad

Document to Model Transition for Architecture Evaluation Approach: Application to a Nuclear Infrastructure Project. 3250
J. Bourdon, P. Couturier, V. Chapurlat, R. Plana, B. Baudouin

Digital Twin for Services (DT4S): Conceptual Strategy 3256
S. Rabah, G. Zacharewicz, V. Chapurlat

An Original Data, Information and Knowledge Management Approach for Model-Based Engineering Projects 3262
M. El Alaoui, S. Rabah, V. Chapurlat, V. Richet, R. Plana

Deep Learning Based Crack Growth Analysis for Structural Health Monitoring 3268
A. Chambon, A. Bellaouchou, V. Atamuradov, F. Vitillo, R. Plana

Adopting Formal Methods on Requirements Verification and Validation for Cyber-Physical Systems: A Systematic Literature Review 3274
Chedhli Masmoudi, Pascale Marange, Eric Bonjour, Eric Levrat, Alain Kerbrat

Nowcasting and Forecasting Morocco GDP Growth Using Google Trends Data 3280
Imane Bouayad, Jihad Zahir, Adil Ez-Zetouni

A Machine Learning Study to Enhance Project Cost Forecasting 3286
Tolga Inan, Timur Narbaev, Öncü Hazir

Using GANs to Generate Lyric Videos 3292
Daniel Gareev, Oliver Glassl, Sana Nouzri

Smart Irrigation System 3298
Asmae El Mezouari, Aziz El Fazziki, Mohammed Sadgal

Implementation of Blockchain Technology to Enhance Last Mile Delivery Models with Sustainability Perspectives 3304
Carol Riona Lobo, Hendro Wicaksono, Omid Fatahi Valilai

The Potential of Blockchain Applications in Urban Industrial Symbiosis 3310
Radu Godina, Aurélien Bruel, Angela Neves, João C. O. Matias

A Private Blockchain Platform to Manage Data Exchange Between Supply Chain Partners 3316
Selmen Boubaker, Parisa Dolatineghabadi, Gael Clement, Yassine Hamdaoui, Aissa Boutaleb

Author Index