



Springer's International Series in Operations Research and Management Science

Call for Chapters in the **Scheduling in Cloud Manufacturing and Industry 4.0**

Editors

Prof. Dr. Eng. Boris Sokolov

Laboratory for Information Technologies in Systems Analysis and Modeling
St. Petersburg Institute of Informatics and Automation of the RAS (SPIIRAS)
E-Mail: sokol@iias.spb.su
Web: <http://litsam.ru/index.php/en/staff-en/boris-v-sokolov>

Prof. Dr. habil. Dmitry Ivanov

Professor of Supply Chain Management
Berlin School of Economics and Law
Badensche Str. 50, 10825 Berlin, Germany
E-Mail: divanov@hwr-berlin.de
Web: blog.hwr-berlin.de/ivanov

Prof. Dr. habil. Alexandre Dolgui

Automation, Production and Computer Sciences Dept.
IMT Atlantique LS2N - CNRS UMR 6004 La Chantrerie
E-Mail: alexandre.dolgui@imt-atlantique.fr
Web: <http://www.emse.fr/~dolgui/>

This book offers an introduction and advanced techniques of scheduling applications to cloud manufacturing and Industry 4.0 systems for larger audience. The Industry 4.0 technology and cloud manufacturing are enabling flexible production, particularly through the use of cyber-physical systems and highly customized assemblies in order to deliver manufacturing services on-demand to consumers. Another peculiarity of scheduling in cloud manufacturing and Industry 4.0 is its data-driven nature. Such innovative production strategies engender new challenges and opportunities for scheduling. This book uncovers fundamental principles and recent developments in the theory and application of scheduling methodology to cloud manufacturing and Industry 4.0.

The Purpose of the Book, the Needs it will Address, and any Distinctive or Innovative Treatments:

Cloud manufacturing and Industry 4.0 emerge with specific scheduling problems with complex hybrid logical and terminal constraints, non-stationarity in process execution as well as complex interrelations

between dynamics in process design, capacity utilization, and machine setups. One difficulty is the strong coupling when product and process are created simultaneously. Simultaneous product and process creation directs the discussion in a class of scheduling problems that have mixed structural-temporal-logical constraints. This requires further investigation and the application of a broad range of methodical approaches.

The purpose of this book is to comprehensively present recent developments in scheduling in cloud manufacturing and Industry 4.0 and to systemize these developments in new taxonomies and methodological principles to shape this new research domain. This book addresses the needs of both researchers and practitioners to uncover the challenges and opportunities of scheduling techniques' applications to cloud manufacturing and Industry 4.0. For the first time, it comprehensively conceptualizes scheduling in cloud manufacturing and Industry 4.0 systems as a new research domain. The chapters of the book are written by the leading international experts and utilize methods of operations research, industrial engineering and computer science. Such a multi-disciplinary combination is unique and comprehensively deciphers major problem taxonomies, methodologies, and applications to scheduling in cloud manufacturing and Industry 4.0.

Distinctive Features:

- It uncovers fundamental principles and recent developments in the theory and application of scheduling methodology to cloud manufacturing and Industry 4.0.
- Bridging the scheduling theory to cloud manufacturing and Industry 4.0 systems
- Systemizing new developments and deciphering taxonomies and methodological principles to shape the new research domain scheduling in cloud manufacturing and Industry 4.0 systems
- Innovative applications of scheduling in cloud manufacturing and Industry 4.0
- Consideration of models with only terminal constraints, with hybrid terminal-logical constraints, and with hybrid structural-terminal-logical constraints
- Analysis of computational algorithms
- Data-driven scheduling models and analytics
- Unique multi-disciplinary view with utilization of operations research, industrial engineering and computer science techniques

The Intended Audience:

Graduate and PhD students in industrial engineering, operations research and management science, production engineers, supply chain and operations management professionals, operations and supply chain researchers.

Chapter Submission

The variety of quantitative analysis methodologies, hybrid methodologies and the analytics-driven approaches, and survey papers are welcome.

The book will consist of about 20 chapters. The length of each Chapter should be about 15-25 pages, including references and all figures and tables. Springer template T1 should be used for Chapter preparations, including Springer reference style: <https://www.springer.com/gp/authors-editors/book-authors-editors/manuscript-preparation/5636>. All the permissions should be obtained by the authors prior to the Chapter submission.

Submission Deadline: September 30, 2019.

Chapters should be submitted to Managing Editor:

Prof. Dr. Dmitry Ivanov; E-Mail: [divanov\(at\)hwr-berlin.de](mailto:divanov(at)hwr-berlin.de)

Recent publications in the field:

- Ahn, G., Park Y.-J., & S. Hur (2018) Performance computation methods for composition of tasks with multiple patterns in cloud manufacturing, *International Journal of Production Research*, DOI: 10.1080/00207543.2018.1451664
- Chen, W., Song, J., Shi, L., Pi, L., & Sun, P. (2013) Data Mining-based Dispatching System for Solving the Local Pickup and Delivery Problem, *Annals of Operations Research*, 203(1), 351–370.
- Dolgui, A., Ivanov, D., Sethi S.P., Sokolov, B. (2018) Scheduling in production, supply chain and Industry 4.0 systems by optimal control. *International Journal of Production Research*, forthcoming.
- Dolgui A., Ivanov D., Potryasaev S., Sokolov B., Ivanova M., Werner F. (2019). Blockchain-oriented dynamic modelling of smart contract design and execution control in the supply chain. *International Journal of Production Research*, in press.
- Frazzon, E.M., Kück, M., Freitag, M. (2018). Data-driven production control for complex and dynamic manufacturing systems. *CIRP Annals*, <https://doi.org/10.1016/j.cirp.2018.04.033>
- Ivanov, D., Sokolov, B., Dolgui, A., Werner, F., Ivanova, M. (2016a) A dynamic model and an algorithm for short-term supply chain scheduling in the smart factory Industry 4.0. *International Journal of Production Research*, 54(2), 386-402.
- Ivanov, D., Sethi S., Dolgui A., Sokolov, B. (2018). A survey on the control theory applications to operational systems, supply chain management and Industry 4.0. *Annual Reviews in Control*, 46, 134-147.
- Kusiak, A. (2018) Smart Manufacturing, *International Journal of Production Research*. 56(1 2), 508–517.
- Liu, Y., Wang, L., Wang, X.V., Xu X. & L. Zhang (2018) Scheduling in cloud manufacturing: state-of-the-art and research challenges, *International Journal of Production Research*, DOI: 10.1080/00207543.2018.1449978
- Panetto H., Iung B., Ivanov D., Weichhart G., Wang X. (2019). Challenges for the cyber-physical manufacturing enterprises of the future. *Annual Reviews in Control*, in press
- Rossit, D.A., Tohmé F., & M. Frutos (2018) Industry 4.0: Smart Scheduling, *International Journal of Production Research*, DOI: 10.1080/00207543.2018.1504248
- Shukla, N., MK Tiwari, G Beydoun (2019) Next generation smart manufacturing and service systems using big data analytics. *Computers & Industrial Engineering*, 128, 905-910
- Tao, F., Qi, Q., Liu, A., Kusiak, A. (2018). Data-driven smart manufacturing. *Journal of Manufacturing Systems*, <https://doi.org/10.1016/j.jmsy.2018.01.006>
- Xu, J., Tran, H.M., Gautam, N., Bukkapatnam, S.T.S. (2019) Joint production and maintenance operations in smart custom-manufacturing systems. *IISE Transactions*, forthcoming.
- Yang, H., Kumara, S., Bukkapatnam, S.T.S, Tsung, F. (2019) The internet of things for smart manufacturing: A review. *IISE Transactions*, forthcoming.
- Yin, Y., Stecke, K.E., Li, D. (2018). The evolution of production systems from Industry 2.0 through Industry 4.0. *International Journal of Production Research* 56(1-2), pp. 848-861.
- Zhou, L., L. Zhang, B. R. Sarker, Y. Laili, and L. Ren. (2018). An Event-triggered Dynamic Scheduling Method for Randomly Arriving Tasks in Cloud Manufacturing. *International Journal of Computer Integrated Manufacturing* 31 (3): 318–333.