15th IFAC Workshop

Intelligent Manufacturing Systems (IMS 2025)

Koszalin, Poland, 11-12 September 2025

https://ims2025.pl/

This proposal is endorsed by TC5.1

Invited Session Proposal:

Numerical methods, modelling and simulations

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Keywords: Software development, Data structures, Internet of Things (IoT), CNC equipment control, Human-Machine Interface (HMI), Web-based applications, Digital Twins

Code: 7326r

ABSTRACT

The assumptions of Industry 4.0 include the aspiration to digitize production and related processes. Digitization requires the implementation of appropriate software, while such software must have implemented appropriate data structures and algorithms operating on these data structures. In this context, the scope of the session includes issues related to numerical methods, simulations and modeling in relation to manufacturing and supporting processes. In particular, it concerns software tools, the use of which makes it possible to provide or transform data used in production and enable simulations and model building based on data sets. The use of solutions falling under this theme allows optimizing selected areas of production and product quality assurance. The topics of the session also include software as a product and the process of software development. In addition, issues that are closely related to software (e.g. Internet of Things, CNC equipment control) and issues where software is coupled with other elements (e.g. Human-Machine Interface, Web-based applications) are welcome. The session provides an excellent space for those who design software components from the business and technical side, as well as for practitioners who implement software, to exchange knowledge and experience.

Authors are invited to submit full papers describing original research work associated with numerical methods, modeling and simulations related problems in areas including, but not limited to:

1. Software development and CASE tools
2. Maintenance modelling for dependable systems, statistical approaches and smart quality assurance
3. Digital Twins for advanced plant operations and simulations
4. Digitalization through the manufacturing chain from product design to production
5. Trustworthy human-system integration in manufacturing plant control
6. IoT methods for manufacturing, fusion of sensor information, signal analysis and failure analysis.
7. Virtualization and simulation techniques for manufacturing decision making
8. Big data analytics for manufacturing systems & processes
9. Augmented reality and computer vision systems
10. Business process models and proces optimization

Contributions containing of both: the theoretical and practical results obtained in this area are welcome.

Timeline:

- **December 16, 2024:** Deadline for paper submission
- **March 03, 2025:** Notification of acceptance/rejection
- **April 07, 2025:** Final paper submission
- **September 11-12, 2025:** 15th IFAC IMS Workshop (IMS 2025), Koszalin, Poland

Manuscript Preparation

For Manuscript Preparation please look at http://www.ifac.papercept.net/conferences/support/support.php
For Manuscript submission please look at https://ifac.papercept.net/conferences/scripts/start.pl
Upon submission, make sure to use the **Invited session identification code: 7326r**

For any further information, please contact the Special Session Technical Committee

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