Invited session: "Digital Twins for plant control in Cyber Physical Systems"

Organized by:

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Recently, manufacturing experienced a relevant shift towards digitalization. The decrease of sensors costs, the reliability and availability of pervasive wireless connectivity, and the generation and collection of big amounts of data are determinant factors for the creation of Digital Twins that describe, replicate, and synchronize the physical reality in the virtual world. Cyber-Physical Systems (CPS) provided the environment to bridge the digital and the real worlds, with their computing and communication capabilities. Given this context, proper digital models and mathematical constructs are claimed and should be built to be able to extract value for decision-making from real-time data. To this end, a serious reflection is firstly required on the role of data modelling, and the connection of Digital Twins to the existing shop floor control architecture, to enable the transition towards their use for plant control in CPS-based production systems. Further requirements should be addressed regarding the balanced use of heterogeneous technologies from different domains (simulation, statistics, and artificial intelligence) to build the Digital Twins required for decision-making. In this way, CPS-based production systems, and Digital Twins as relevant concept within them, pave the way to advancements in decision-making for the monitoring, control and optimization of shop floor activities and operations.

This invited session calls high-quality contributions that investigate the main research challenges, reviews, case studies, and applications related to the following topics (but not limited to):

- Simulation synchronized with the field
- Data-driven or simulation-based production scheduling and control
- Data-driven or simulation-based methods for maintenance, repair, diagnostics and prognostics
- Applications in integrated production and maintenance
- Applications in integrated production and factory logistics
- Industrial IoT and Real-time big data connection in the shop-floor
- Ontologies and data models for Cyber-Physical System-based manufacturing systems
- Interoperability and design, implementation, deployment, evolution of Cyber-Physical Systems-of-Systems
- Integration and synchronization of virtual models and physical manufacturing systems
- Platforms and architectures for manufacturing data management and analysis and for Digital Twins
- Artificial Intelligence-based methodologies on the shop floor, and their connection to engineering Digital Twins (including Holonics, Multi Agent Systems, etc.) and to automated learning of Digital Twins (including Neural Networks, Support Vector Machine, etc.)
- Roles of MES/MOM systems in a smart factory
- Case studies from industry

PAPER SUBMISSION:
Authors are invited to submit draft papers reporting original research of theoretical or applied nature, on the topics of the session. Final manuscripts are limited to 6 pages

INVITED SESSION CODE: 18m7h
When you submit your paper to the IFAC system, you will be required this ID number in order to associate your paper to the invited session:
https://ifac.papercept.net/

IMPORTANT DATES:

Full papers submission deadline:	**31st/10/2020**
Notification of acceptance:	**1st/12/ 2020**
Final papers submission deadline:	**1st/02/2021**
Early registration deadline:	**8th/02/2021**
Late registration deadline:	**1st/04/2021**
Conference date:	**7th-9th/06/2021**