14th World Congress on Computational Mechanics (WCCM XIV)
8th European Congress on Computational Methods in Applied Science and Engineering (ECCOMAS 2020)
July 19–24, 2019, Paris, France

# COMPUTATIONAL METHODS FOR REALIZING DIGITAL TWINS TRACK NUMBER (900)

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**Key words:** Digital Twins, Computational Mechanics, Model Order Reduction, Optimization and Control

## ABSTRACT

An increasing number of disruptive innovations with high economic and social impact shape our digitalizing world. Simulation technologies are key enablers of digitalization, since they facilitate digital twins that mirror physical products and systems into the digital world. However, digital twins require a paradigm shift in computational engineering: Instead of expert centric tools, such as common CAx software, engineering and operation require largely autonomous digital assist systems that continuously interact with the physical environment through background simulation, optimization and control. This new type of digital engineering tools must efficiently integrate models and data from different product life cycle phases and master the resulting exploding computational complexities. This minisymposium aims to connect experts from both academia and industry who are interested in addressing the challenges of realizing digital twins. Potential topics include the development of novel computational methods, as well as their implementation for real-world problems and industrial applications. Some of the challenges, topics and techniques to be addressed within this minisymposium can include:

- Transfer of highly detailed and complex simulation models and data to other domains and life cycle phases
- Co-simulation methods and model predictive control integrating operational real-world data
- Model order reduction methods for efficient and accurate co-simulation, control and optimization
- Methods for prediction, control and optimization under uncertainties
- Integrated modeling and design optimization based on process and usage information
- Industrial applications and implementations of digital twins

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