Invited Session Proposal for MIM 2019

The Future of Metal Processing

9th IFAC Conference on Manufacturing Modeling, Management, and Control (MIM 2019)
28. - 30. August 2019, Berlin, Germany

Chairs:

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Abstract:

Today's manufacturing systems are designed as individual islands along the process chain. They focus on implementing certain machine variables reliably instead of the desired feature of the final product. Consequently, machine controllers reproduce machine commands very accurately, but fail to control the resulting product quality. Furthermore, nonlinear machine behavior, changing environmental conditions or external disturbances may affect the final product but not the machine values. Hence, new machining concepts require a higher level of autonomy to achieve both, robustness and productivity.

This invited session presents approaches and assistance systems that increase the autonomy of different stations along the manufacturing chain. These individual approaches contribute to the vision of an "Internet of Production" as a network of autonomous manufacturing machines mutually exchanging information and learning from each other. Information has to be exchanged in terms of general models ("digital shadow") over different machines and tuned on the edge to the current machine and process behavior. Model identification is a key enabler for process optimization and predictive control strategies. To eventually reach the objective of a worldwide production lab, the autonomy of every station along a process chain needs to be increased. This session focuses on metal processing and presents examples from tool path planning to milling and grinding. Besides conventional machine tool concepts, new robotic-based concepts are presented. We limit the examples of this section to manufacturing technologies of metal processing, although the scope is broader: the novel approaches and concepts are applicable to other manufacturing systems.

Specific topics of interest are, but not limited to:

- model-based control systems for metal processing,
- system identification for model-adaption,
- estimation of product-relevant process values by softsensors,
- optimization of process planning strategies based on measurements,
- robotic-assisted manufacturing.

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Important Dates:

Paper Submission: 15 December 2018
Notification of Acceptance: 20 February 2019
Final Paper Submission: 15 March 2019