RESEARCH TOPIC FOR THE PARISTECH/CSC PHD PROGRAM

Field: Design, Industrialization

Subfield: Industrial Engineering

Title: Reconfigurable Process Control for Reconfigurable Production/Manufacturing Systems

ParisTech School: Arts et Métiers Sciences et Technologies

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Short description of possible research topics for a PhD:
Reconfigurable production systems are becoming more and more present in manufacturing industries, in response to market and product variations. On the other hand, these systems are more and more equipped with intelligence, new technologies and generate a large amount of data during their use. For many years, academic and industrial research has been oriented towards the Industry 4.0 paradigm, with an emphasis on technological aspects and their integration. Now that these technologies are nearing maturity, we need to work on the management of these systems and their supervision. In this sense, the Process Control techniques that enable data analysis, detection of system drifts, prediction of system failures and/or product quality must be reconsidered and adapted to the reconfigurability of the system and products. The objective of this thesis is to propose a tool-based methodology allowing dynamic reconfigurability of inspection operations and process control techniques according to the system configuration.

Required background of the student: Mech. Eng. or Ind. Eng.

A list of 5 (max.) representative publications of the group:

1. Mohammadi, M., Dantan, J.-Y., Siadat, A., Tavakkoli-Moghaddam, R., 2018. A bi-objective robust inspection planning model in a multi-stage serial production system. International Journal of Production Research 56, 1432–1457.
2. Xia, Q., Etienne, A., Dantan, J.-Y., Siadat, A., 2018. Reconfigurable machining process planning for part variety in new manufacturing paradigms: Definitions, models and framework. Computers and Industrial Engineering 115, 206–219.
3. Mehrdad MOHAMMADI, Jean-Yves DANTAN, Ali SIADAT, Reza TAVAKKOLI-MOGHADDAM, «A bi-objective robust inspection planning model in a multi-stage serial production system», International Journal of Production Research, 56(4), pp. 1432-1457, 2018,
4. Meysam MOUSAVI, Shirin MIRDAMADI, Ali SIADAT, Jean-Yves DANTAN, Reza TAVAKKOLI-MOGHADDAM, «A new intuitionistic fuzzy grey model for selection

problems with an application to the inspection planning in manufacturing firms», Engineering Applications of Artificial Intelligence, Elsevier Editor, Volume 39, Pages 157-167, 2015,
5. Abdul Salam Khan, Lazhar Homri, Jean Yves Dantan, Ali Siadat, 2020, “A Multi-objective Assessment of Process Planning in a Disruptive Reconfigurable Manufacturing System: Application of Multi-heuristics” , IEEE 7th International Conference on Industrial Engineering and Applications