## Verification and validation of the production process model

## Sebastjan Zorzut

"Jožef Stefan" Institute, Ljubljana, Slovenia

*E-mail:* <u>sebastjan.zorzut@ijs.si</u>

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**Abstract:** Examining the behaviour of an industrial process is a complex and difficult task. Most of the industrial processes support a collection and storage of the production data and thus allow for history examination and past data checks. Trying novel approaches or algorithms in a production line is however, a completely different story. It is irrational to expect from the production manager to let you experiment on the production process in order to proof the assumed benefits of the novel approach.

The production process is normally complex with many activities, sub-processes, interconnections and unexpected events. The key to effective modelling is clear definition of model purpose. This usually results in simplifications of the modelled process. The proper choice of modelling software can fulfil the demanded tasks. Decision has been made to model the production process of polymerisation with standard modelling software Matlab, Simulink and Stateflow and to store the simulated data in the Microsoft Access database.

The developed model can be used for testing novel approaches in production management. The assumption is that by controlling the most significant variables of the process, so called key performance indicators (KPI), it is possible to optimize the production.

But before work on this task is started model verification and validation has to be performed. Verification concerns the consistency and accuracy of simulation programs compared with the associated mathematical models, while model validation concerns the level of agreement between mathematical descriptions and the real system under investigation. Without validation a model is of very little use. In the process of validation it is necessary to investigate if the model is suitable for the intended use. Model quality can be judged with respect to several features:

- model usefulness: purpose of the model is satisfied,
- model falseness: agreement with measurements,

- model plausibility: conformity of the model with a priori knowledge about the process.

Validation process is usually reduced to model falseness, what is in practice done as evaluation of agreement of model and process output signals. The proposed process of validation is therefore more comprehensive and can lead to better applicability of models.