MODEL TOPOLOGY OF ACTIVE PROTECTIVE COATING

Heinz A.Preisig[1], Peter Klein[2] and Natalia Konchakova[3]

[1] Dept of Chemical Engineering, NTNU, 7491 Trondheim, Norway,
heinz.preisig@chemeng.ntnu.no
[2] Fraunhofer ITWM, D-67663 Kaiserslautern, Germany,
peter.klein@itwm.fraunhofer.de
[3] Helmholtz-Zentrum Hereon, D-21502 Geesthacht, Germany,
natalia.konchakova@hereon.de

Keywords: *Multi-scale modelling, simulation workflows, materials, decision support*

Motivation: Product design in the light of a business requires information from the business and physical domains, which, from a computational engineering perspective, implies integrating business decision tools with process and material simulation processes.The integration is not only in the coupling of the tools but also in the exchange of data. The business workflow management systems must communicate with analysis tools, optimisation and decision support systems, some of which require process simulations. The process simulation, in turn, will, in general, model several layers of time scales, which may range from quantum mechanics to the finished product's mechanical properties.

Approach: A workflow describes how one logically combines different activities to achieve a defined goal. Tools like CAMUNDA are based on the Business Process Modelling concept, and they are well established and easy to use. In contrast, workflows for the simulation of physical systems are rarer and require expert knowledge. A typical example is multi-scale modelling, where the problem of interest covers any sub-range from quantum mechanics to macroscopic product properties. For some years, NTNU developed a modelling/simulation suite that is ontology-based, ProMo, for Process Modelling. Reductionism forms the background, and processes are represented as interacting networks of mass/energy/momentum. Like BPM tools, we use a visual language to model processes.

Paper & Presentation: We will discuss the use of workflows on an industrial example being the object in the VIPCOAT EU project. CAMUNDA is used to model the business layer, and the ProMo technology is employed to construct the process model. We shall address the issue of Petri-net synchronising the different activities in workflows. We will also discuss the challenges with exchanging information between different workflow representations, different levels of workflows and separate workflows. We address the data exchange problem by employing a shared dataspace as a unified knowledge base, managing different data sources containing variables, configurations, accumulated data, and data representations (meta-data and ontologies).