

Structural Modeling in Biomedical and Product Engineering

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Abstract. Structural modeling is common for biomedical systems as well as manufactured products. Examples and experience from both fields clarify modeling issues applicable to each field. Modeling in both fields shares the commonality that a model describes one or more physical, or virtual, structures in terms of their components and connections between components. Modeling effectiveness depends on the relationship between the model and the systems which realize or conform to the model. The logic based approaches used for biomedical modeling can be adapted for engineering with the promise that automated reasoning can be integrated into product development and maintenance. Modeling languages such as SysML provide good graphical syntax and the concepts needed for representing product decompositions and interconnections in multiple domains. This paper illustrates the benefits of working within a logic-based framework which incorporates the concepts of part decompositions and interconnections found in SysML. The concept of a model as an axiom set used in conceptual modeling languages such as OWL 2 is applied to SysML models. This discussion is intended for model practitioners in both fields.