Accounting for Uncertainty and Complexity in the Realization of Engineered Systems

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Abstract Industry is faced with complexity and uncertainty and we in academia are motivated to respond to these challenges. Hence this paper is the product of thoughts for exploring the model-based realization of engineered systems. From the perspective that the activity of designing is a decision making process, it follows that better decisions will be made when a decision maker is better informed about the available choices and the ramification of these choices. Presented in this paper, in the context of an example of designing a small thermal plant is a description of an approach to exploring the solution space in the process of designing complex systems and uncovering emergent properties. The question addressed is that given a relevant model, what new knowledge, understanding of emergent properties and insights can be gained by exercising the model? In this paper, the observations made are reported in the context of the Validation Square.

Keywords: Decision-based, Model-based, Compromise, Complex Systems, Solution Space Exploration, Decision Support Problem

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