

Models in Engineering

Key Takeaways

WEEK 1: WHAT IS A MODEL?

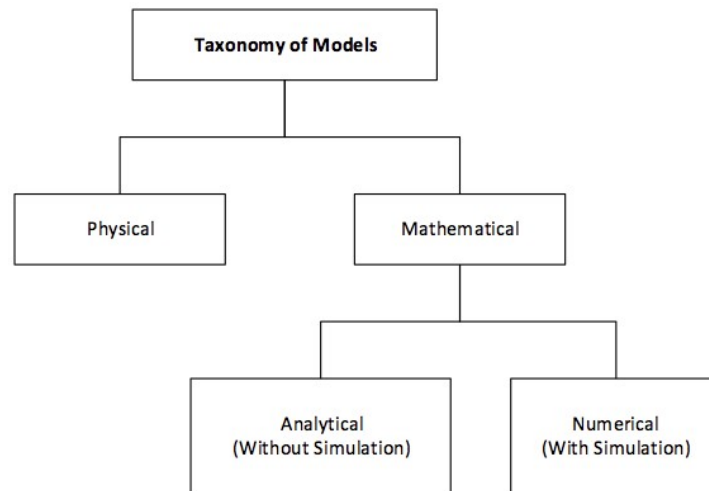
Qualities of Great Models

For the duration of this course, we will be building up a list of the “qualities of great models” with the purpose of distilling guidelines for building and using models effectively. Every week the list will grow with new items presented in the course.

From what you have learned in Week 1, there are three main elements that should be taken into consideration when developing a model:

1. **Model Fidelity:** The model should have the appropriate level of fidelity relative to the decision under consideration and the phase of the design. More fidelity than necessary can make it difficult to evaluate the model and can waste resources which could have been utilized elsewhere. Less fidelity than necessary can result in poor decisions or overconfidence. The choice of fidelity depends upon the system requirements and operating conditions.
2. **Model Credibility:** Credibility refers to whether the results of the model are believed by decision-makers. If models are not credible, decision-makers will not make decisions based on the model's output, which might waste precious time and resources, or worse still result in incorrect decisions that might put the project at risk. There are many ways in which to build model credibility -- one of which is having a set of standards and processes that guide the evaluation and validation of the model.
3. **Linked to Decision Support:** The real value of models lies in using them in the decision-making process, particularly where we have to trade-off between a lot of parameters. The best models make evident how their outputs are to be used in decision-making.

Week 1>Defining Models>A Taxonomy of Models>



Week 1> Models Fidelity and Credibility>Model Fidelity vs. Model Credibility>

MODEL FIDELITY VS. CREDIBILITY

