

Brainstorming Exercise: Modeling and Simulation Terminology and Concepts

1. For each of the following terms, write down phrases that define or otherwise describe the term as you currently understand it in the context of mathematical modeling (if you don't know, take a guess!):

model

mathematical model

system

simulation

validation

phenomenological model

mechanistic model

stationary model

stochastic model

2. For each of the following statements, say whether you agree or disagree (and be prepared to explain your reason(s)):

- a. A good model is one that mimics the part of reality to which it pertains as closely as possible.
- b. The best model is one that is as simple as possible while still allowing us to understand a system well enough to answer the question at hand.
- c. We should know the purpose of a model before we start to create it – i.e., modeling should be purpose-drive, or *teleological*.
- d. Mathematical modeling and simulation of a problem make physical experimentation superfluous.
- e. The formulation of a mathematical model is separate from the computer solution of the mathematical problems posed by the model.
- f. To do modeling and simulation, you must be an expert mathematician.