

Models of Machines and Models of Phenomena

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Abstract

Experimental engineering models have been used both to model general phenomena, such as the onset of turbulence in fluid flow, as well as to predict the performance of machines of particular size and configuration in particular contexts, such as ships in canals, aeroplanes in the atmosphere, and buildings situated in various geographical areas.

The question as to what sorts of knowledge are involved in the method -- logical consistency, general scientific principles, laws of specific sciences, and/or experience -- remains unanswered even after the method has been described. Adjectives such as "mysterious" have been used in describing a fundamental theorem about the method, and various accounts place different amounts of emphasis on the role of experience involved in applying it.

I will discuss three different accounts of the foundations of the method of experimental engineering models (scale models), and examine how theory, practice, experience, and models of phenomena (as well as models of machines) are involved in employing the method to obtain practical results.

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