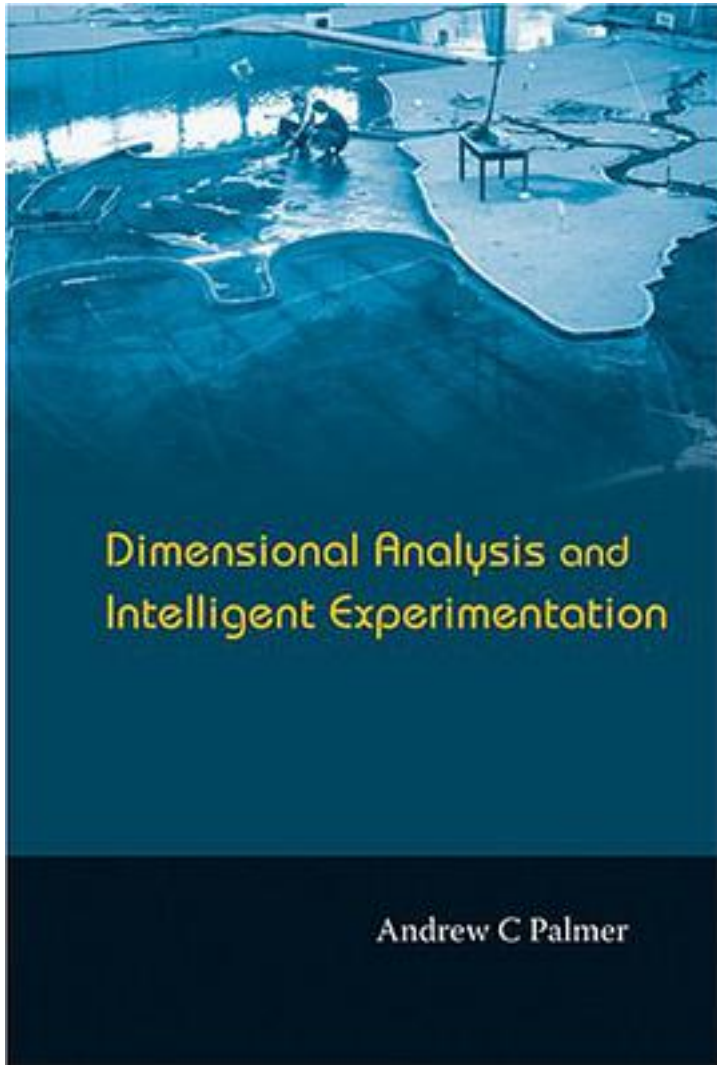# Dimensional Analysis and Intelligent Experimentation



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Dimensional analysis is a magical way of finding useful results with almost no effort. It makes it possible to bring together the results of experiments and computations in a concise but exact form, so that they can be used efficiently and economically to make predictions. It takes advantage of the fact that phenomena go their way independently of the units we measure them with, because the units have nothing to do with the underlying physics. This simple idea turns out to be unexpectedly powerful.

Students often fail to gain from dimensional analysis, because bad teaching has led them to suppose it cannot be used to derive new results, and can only confirm results that have been secured by some other route. That notion is false. This book demonstrates what can be done with dimensional analysis through a series of examples, starting with Pythagoras theorem and the simple pendulum, and going on to a number of practical examples, many from the author s experience in ocean engineering. In parallel, the book explains the underlying theory, starting with Vaschy s elegant treatment, whilst avoiding unnecessary complexity. It also explores the use and misuse of models, which can be useful but can also be seriously misleading.

Contents:Introduction; Numbers and Units in Engineering and Physics; Dimensions, Dimensionless Groups, and Variables; Dimensional Analysis; Similarity and Intelligent Experimentation; Equations in Nondimensional Form; Physical Models; Solutions to Problems.

作者介绍:

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