mathematics undergraduate is not likely to have the knowledge of special functions, continuum mechanics, etc. needed to fully appreciate the applications. A number of interesting problems appear at the ends of the chapters, and the authors claim that the reader who evades the problems will miss 72% of the value of the book.

The problems treated in this text, as in the case of most books on partial differential equations, fall into the special category of well-posed problems. As pointed out by John in the book of Bers, John and Schechter, well-posed problems by no means exhaust the subject of partial differential equations. He observes that one may think of the solution of a well-posed problem as predicating the outcome of an experiment for a given arrangement of apparatus. The determination of what arrangement will produce a desired effect or what arrangement led to certain observed effects will correspond in general to a much more difficult mathematical problem, a problem that may not be well posed. In partial differential equations one may in fact not know, for a given equation, what classes of initial and/or boundary value problems are well posed, i.e., he may not know what apparatus to use.

A substantial percentage of interesting and important physical problems must of necessity be modeled as improperly posed mathematical problems, but since improperly posed problems can rarely be handled by standard analytical methods, such problems are largely ignored in books on partial differential equations.

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Topological transformation groups 1: *A categorical approach*, J. de Vries, Mathematical Centre Tracts, no. 65, Mathematisch Centrum, Amsterdam, 1975, v + 249 pp.

In this review, I will rapidly trace some stability concepts from their physical origins, along a path of increasing abstraction, into varieties of compact transformation groups. Much of the work already done (including de Vries' book) represents secondary technical research for which the primary investigations are still wanting.

I wish to thank Murray Eisenberg for helpful criticism and for the Markus and Palis references.

1. From differential equations to continuous flows. A 'nice' autonomous differential equation

$$\dot{x} = f(x), \qquad x \in X \subset \mathbf{R}^n,$$

admits unique solutions $\pi(x, t)$ with $\pi(x, 0) = x$, which are global in the sense that π is defined on $X \times \mathbf{R}$. If we refer only to the facts that X is a topological space and that $\pi: X \times \mathbf{R} \to X$ is a continuous action on X by the topological group $\mathbf{R}$ of reals, we may still discuss some of the qualitative dynamical properties of the system. This is where 'topological dynamics' comes from.