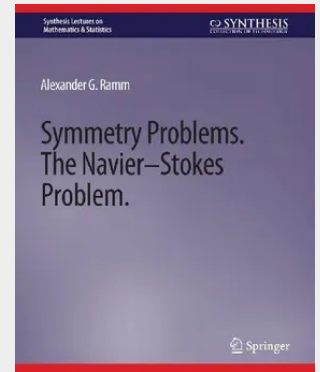


Symmetry Problems

The Navier-Stokes Problem

This book gives a necessary and sufficient condition in terms of the scattering amplitude for a scatterer to be spherically symmetric. By a scatterer we mean a potential or an obstacle. It also gives necessary and sufficient conditions for a domain to be a ball if an overdetermined boundary problem for the Helmholtz equation in this domain is solvable. This includes a proof of Schiffer's conjecture, the solution to the Pompeiu problem, and other symmetry problems for partial differential equations. It goes on to study some other symmetry problems related to the potential theory. Among these is the problem of "invisible obstacles." In Chapter 5, it provides a solution to the Navier-Stokes problem in $\mathbb{R}^3$. The author proves that this problem has a unique global solution if the data are smooth and decaying sufficiently fast. A new a priori estimate of the solution to the Navier-Stokes problem is also included. Finally, it delivers a solution to inverse problem of the potential theory without the standard assumptions about star-shapeness of the homogeneous bodies.

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