

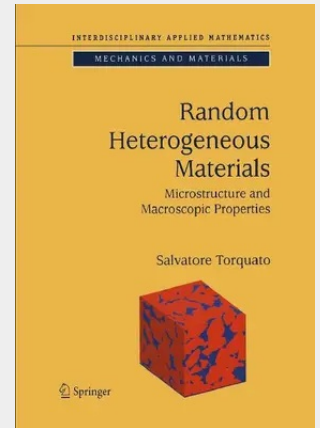
Torquato

Random Heterogeneous Materials

Microstructure and Macroscopic Properties

The interdisciplinary subject of random heterogeneous materials has experienced remarkable growth since the publication of the well-known monograph Statistical Continuum Theories by Beran (1968). Many of these advances, especially those concerning the statistical characterization of the microstructure and its effect on the physical properties of the material, have not been treated fully in any book. One of the intents of the present book is to fill this gap. This book also distinguishes itself in that it provides a unified rigorous framework to characterize the microstructures and macroscopic properties of the widely diverse types of heterogeneous materials found in nature and synthetic products. Emphasis is placed on providing foundational theoretical methods that can simultaneously yield results of practical utility. This book treats a wide breadth of topics, but the choice of subjects naturally reflects my own interests. The sheer enormity of the field has prevented me from covering many important topics. I apologize to those colleagues, known and unknown, who may not find enough of their own work cited in the ensuing pages.

A heterogeneous material consists of domains of different materials or the same material in different states. This book provides graduate students and researchers in applied mathematics, physics, chemistry, materials science and engineering with a unified approach of treating the microstructure and effective properties of heterogeneous media. Although it covers the latest advances in the field, it is written in an accessible style and will be sufficiently well-contained for the non-expert wishing to learn the field.



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