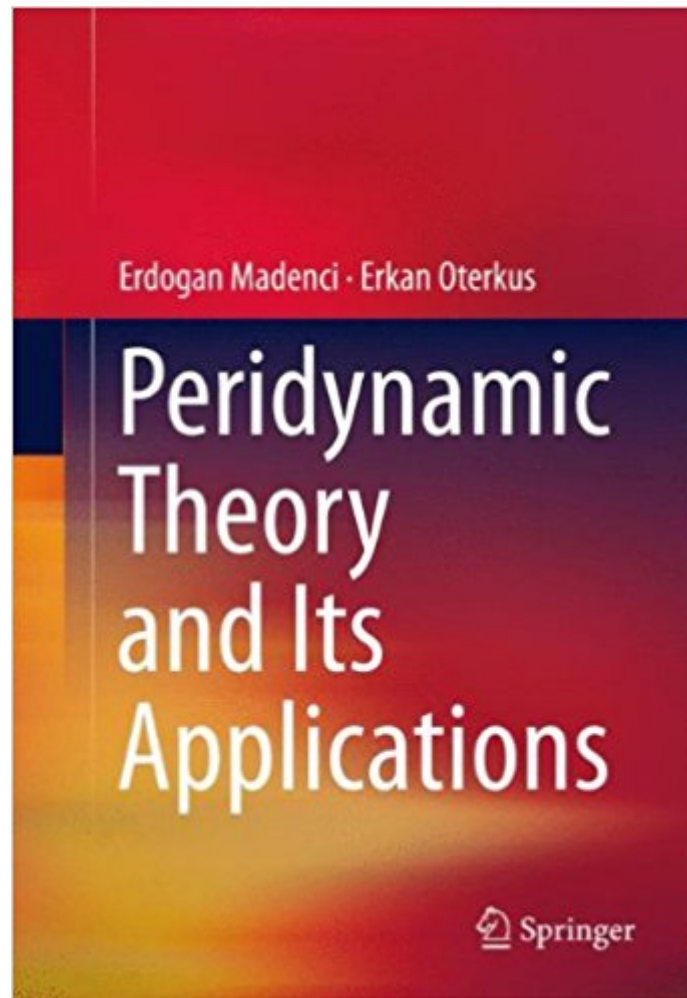




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Peridynamic Theory And Its Applications



Synopsis

This book presents the peridynamic theory, which provides the capability for improved modeling of progressive failure in materials and structures, and paves the way for addressing multi-physics and multi-scale problems. The book provides students and researchers with a theoretical and practical knowledge of the peridynamic theory and the skills required to analyze engineering problems. The text may be used in courses such as Multi-physics and Multi-scale Analysis, Nonlocal Computational Mechanics, and Computational Damage Prediction. Sample algorithms for the solution of benchmark problems are available so that the reader can modify these algorithms, and develop their own solution algorithms for specific problems. Students and researchers will find this book an essential and invaluable reference on the topic.

Book Information

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Customer Reviews

From the book reviews: “The book is very interesting from the methodical viewpoint, presenting a comparatively new theory of solid mechanics, accompanying the text by many examples, which can be useful to students studying the novel approaches to solid mechanics and related topics, and also to their teachers preparing lectures and practical works.” (I. A. Parinov, zbMATH, Vol. 1295, 2014)

The peridynamic theory provides the capability for improved modeling of progressive failure in materials and structures, paving the way to address multi-physics and multi-scale problems.

Because it is based on concepts not commonly used in the past, the purpose of this book is to explain the peridynamic theory in a single framework. It presents not only the theoretical basis but also its numerical implementation. The book begins with an overview of the peridynamic theory and derivation of its governing equations. The relationship between peridynamics and classical continuum mechanics is established, and this leads to the ordinary state-based peridynamics formulations for both isotropic and composite materials. Numerical treatments of the peridynamic equations are presented in detail along with solutions to many benchmark and demonstration problems. In order to take advantage of salient features of peridynamics and the finite element method, a coupling technique is also described. Finally, an extension of the peridynamic theory for thermal diffusion and fully coupled thermomechanics is presented with applications. Students and researchers alike will find this book an essential and invaluable reference on the topic. It offers both theoretical and practical knowledge of the peridynamic theory and may be used in courses such as Multi-physics and Multi-scale Analysis, Nonlocal Computational Mechanics, and Computational Damage Prediction. Sample algorithms for the solution of benchmark problems are available at <http://extras.springer.com> for researchers and graduate students, who can modify these algorithms and develop their own solution algorithms for specific problems.

it's a good book and well written, but it is too expensive considering that it has not coloured images.

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