



Nonlinear Elastic Waves in Materials (Foundations of Engineering Mechanics)

By Jeremiah J. Rushchitsky

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The main goal of the book is a coherent treatment of the theory of propagation in materials of nonlinearly elastic waves of displacements, which corresponds to one modern line of development of the nonlinear theory of elastic waves.

The book is divided on five basic parts: the necessary information on waves and materials; the necessary information on nonlinear theory of elasticity and elastic materials; analysis of one-dimensional nonlinear elastic waves of displacement – longitudinal, vertically and horizontally polarized transverse plane nonlinear elastic waves of displacement; analysis of one-dimensional nonlinear elastic waves of displacement – cylindrical and torsional nonlinear elastic waves of displacement; analysis of two-dimensional nonlinear elastic waves of displacement – Rayleigh and Love nonlinear elastic surface waves.

The book is addressed first of all to people working in solid mechanics – from the students at an advanced undergraduate and graduate level to the scientists, professionally interesting in waves. But mechanics is understood in the broad sense, when it includes mechanical and other engineering, material science, applied mathematics and physics and so forth. The genesis of this book can be found in author's years of research and teaching while a head of department at SP Timoshenko Institute of Mechanics (National Academy of Sciences of Ukraine), a member of Center for Micro and Nanomechanics at Engineering School of University of Aberdeen (Scotland) and a professor at Physical-Mathematical Faculty of National Technical University of Ukraine "KPI".

The book comprises 11 chapters. Each chapter is complemented by exercises, which can be used for the next development of the theory of nonlinear waves.

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Review

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“In this monograph, the author presents the theory of elastic waves in nonlinear elastic materials. The book requires the knowledge of basic mathematics and continuum mechanics, and is aimed at senior undergraduates, postgraduates and researchers working in nonlinear elasticity. ... The book will be quite useful to engineers and applied mathematicians as a source of different nonlinear models and constitutive equations for elastic waves.” (Fiazud Din Zaman, zbMATH, Vol. 1302, 2015)

From the Back Cover

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