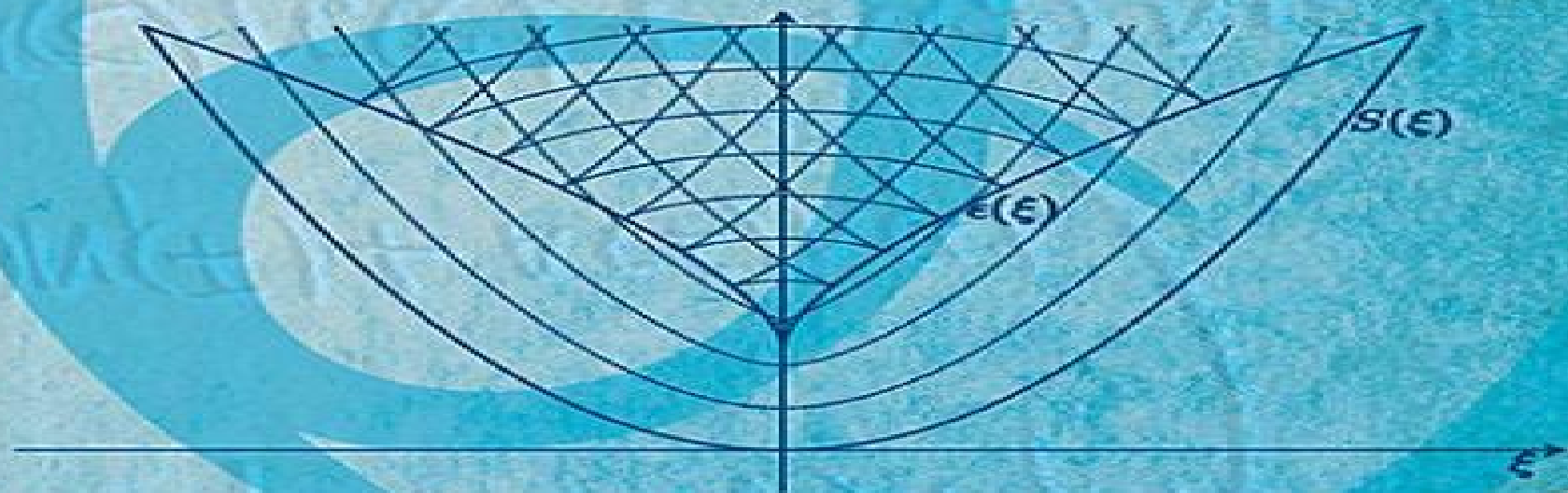


WAVEFRONTS AND RAYS AS CHARACTERISTICS AND ASYMPTOTICS

Second Edition

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Wavefronts and Rays Andrej Bóna, Michael A. Slawinski, 2014 **Wavefronts and Rays as Characteristics and Asymptotics** Andrej Bóna, Michael A. Slawinski, 2011 This textbook incorporated with many illuminating examples and exercises is aimed at graduate students of physical sciences and engineering The purpose is to provide a background of physics and underlying mathematics for the concept of rays filling the gap between mathematics and physics textbooks for a coherent treatment of all topics The authors emphasis and extremely good presentation of the theory of characteristics which defines the rays accentuate the beauty and versatility of this theory To this end the rigour of the formulation by a pure mathematician s standards is downplayed to highlight the physical meaning and to make the subject accessible to a wider audience The authors describe in detail the theory of characteristics for different types of differential equations the applications to wave propagation in different types of media and the phenomena such as caustics

Waves And Rays In Seismology: Answers To Unasked Questions (Second Edition) Michael A Slawinski, 2018-05-04 In summary Professor Slawinski has written an engaging volume covering an unfamiliar topic in a highly accessible fashion Non specialists will gain a significant appreciation of the unique complexities associated with seismology Contemporary Physics The author dedicates this book to readers who are concerned with finding out the status of concepts statements and hypotheses and with clarifying and rearranging them in a logical order It is thus not intended to teach tools and techniques of the trade but to discuss the foundations on which seismology and in a larger sense the theory of wave propagation in solids is built A key question is why and to what degree can a theory developed for an elastic continuum be used to investigate the propagation of waves in the Earth which is neither a continuum nor fully elastic But the scrutiny of the foundations goes much deeper material symmetry effective tensors equivalent media the influence or rather the lack thereof of gravitational and thermal effects and the rotation of the Earth are discussed ab initio The variational principles of Fermat and Hamilton and their consequences for the

propagation of elastic waves causality Noether's theorem and its consequences on conservation of energy and conservation of linear momentum are but a few topics that are investigated in the process to establish seismology as a science and to investigate its relation to subjects like realism and empiricism in natural sciences to the nature of explanations and predictions and to experimental verification and refutation In the second edition new sections figures examples exercises and remarks are added Most importantly however four new appendices of about one hundred pages are included which can serve as a self contained continuum mechanics course on finite elasticity Also they broaden the scope of elasticity theory commonly considered in seismology

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An Introduction to Geometrical Physics Aldrovandi Ruben, Pereira Jose Geraldo, 2016-10-07 This book focuses on the unifying power of the geometrical language in bringing together concepts from many different areas of physics ranging from classical physics to the theories describing the four fundamental interactions of Nature gravitational electromagnetic strong nuclear and weak nuclear The book provides in a single volume a thorough introduction to topology and differential geometry as well as many applications to both mathematical and physical problems It is aimed as an elementary text and is intended for first year graduate students In addition to the traditional contents of books on special and general relativities this book discusses also some recent advances such as de Sitter invariant special relativity teleparallel gravity and their implications in cosmology for those wishing to reach a higher level of understanding

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independent study The details of mathematical methods are discussed in the appendices which form a substantial portion of the book **Waves And Rays In Elastic Continua (3rd Edition)** Michael A Slawinski, 2014-12-15 The present book which is the third significantly revised edition of the textbook originally published by Elsevier Science emphasizes the interdependence of mathematical formulation and physical meaning in the description of seismic phenomena Herein we use aspects of continuum mechanics wave theory and ray theory to explain phenomena resulting from the propagation of seismic waves The book is divided into three main sections Elastic Continua Waves and Rays and Variational Formulation of Rays There is also a fourth part which consists of appendices In Elastic Continua we use continuum mechanics to describe the material through which seismic waves propagate and to formulate a system of equations to study the behaviour of such a material In Waves and Rays we use these equations to identify the types of body waves propagating in elastic continua as well as to express their velocities and displacements in terms of the properties of these continua To solve the equations of motion in anisotropic inhomogeneous continua we invoke the concept of a ray In Variational Formulation of Rays we show that in elastic continua a ray is tantamount to a trajectory along which a seismic signal propagates in accordance with the variational principle of stationary traveltime Consequently many seismic problems in elastic continua can be conveniently formulated and solved using the calculus of variations In the Appendices we describe two mathematical concepts that are used in the book namely homogeneity of a function and Legendre's transformation This section also contains a list of symbols

On Foundations Of Seismology: Bringing Idealizations Down To Earth James Robert Brown, Michael A Slawinski, 2017-04-27 I can wholeheartedly recommend this book students researchers college and university science professors and readers of The Leading Edge I also recommend it to all those who want to enrich their own experience of practicing and teaching science with some carefully considered soul searching on how it all fits together in the human story of figuring things out It is written throughout with precise and careful language prudently paced carefully crafted eloquently enunciated and playfully illuminated The Leading Edge This remarkable collaboration between a mathematical physicist and a science philosopher concerns foundational and conceptual issues in seismology Their aim is to present mathematical physical and philosophical topics in a clear and concise manner They provide an extensive philosophical discussion of the methods of science and show how seismology fits in They explain with care and precision the basic structure of seismology which is built on classical continuum mechanics Not only do they explain how various models work in seismology they also include an extensive discussion of the nature of models and idealizations **Singularities of Caustics and Wave Fronts** Vladimir

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