



## Nonlinear Ocean Waves and the Inverse Scattering Transform, Volume 97 (International Geophysics)

By Alfred Osborne

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### Nonlinear Ocean Waves and the Inverse Scattering Transform, Volume 97 (International Geophysics) By Alfred Osborne

For more than 200 years, the Fourier Transform has been one of the most important mathematical tools for understanding the dynamics of linear wave trains. *Nonlinear Ocean Waves and the Inverse Scattering Transform* presents the development of the nonlinear Fourier analysis of measured space and time series, which can be found in a wide variety of physical settings including surface water waves, internal waves, and equatorial Rossby waves. This revolutionary development will allow hyperfast numerical modelling of nonlinear waves, greatly advancing our understanding of oceanic surface and internal waves. Nonlinear Fourier analysis is based upon a generalization of linear Fourier analysis referred to as the *inverse scattering transform*, the fundamental building block of which is a generalized Fourier series called the Riemann theta function. Elucidating the art and science of implementing these functions in the context of physical and time series analysis is the goal of this book.

- Presents techniques and methods of the inverse scattering transform for data analysis
- Geared toward both the introductory and advanced reader venturing further into mathematical and numerical analysis
- Suitable for classroom teaching as well as research

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By Alfred Osborne Bibliography

- Rank: #2927129 in Books
- Published on: 2010-03-15
- Original language: English
- Number of items: 1
- Dimensions: 9.10" h x 1.60" w x 6.10" l, 3.15 pounds
- Binding: Hardcover
- 944 pages

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#### **Review**

"The book is an encyclopaedia of mathematical models of nonlinear ocean waves and methods of their investigation." --**Zentralblatt MATH 1250**

"The book should be of great interest not only to oceanographers, but to others interested in the intriguing physics of nonlinear waves. Much of the theory developed in the book applies to other branches of physics, such as plasma physics and nonlinear optics. Because of the high quality of writing, this book may make an ideal focus for graduate-level seminars as well as being a comprehensive reference text on nonlinear water waves." --**Pure and Applied Geophysics**

About the Author  
Alfred Osborne

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