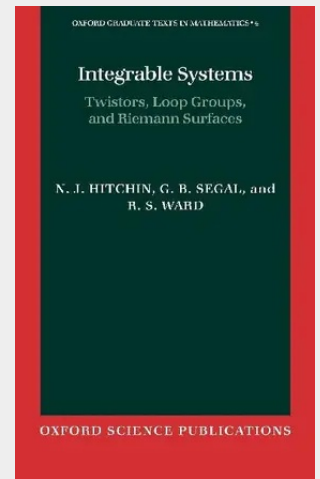


Integrable Systems

Twistors, Loop Groups, and Riemann Surfaces

This textbook is designed to give graduate students an understanding of integrable systems via the study of Riemann surfaces, loop groups, and twistors. The book has its origins in a series of lecture courses given by the authors, all of whom are internationally known mathematicians and renowned expositors. It is written in an accessible and informal style, and fills a gap in the existing literature. The introduction by Nigel Hitchin addresses the meaning of integrability: how do we recognize an integrable system? His own contribution then develops connections with algebraic geometry, and includes an introduction to Riemann surfaces, sheaves, and line bundles. Graeme Segal takes the Kortewegde Vries and nonlinear Schrödinger equations as central examples, and explores the mathematical structures underlying the inverse scattering transform. He explains the roles of loop groups, the Grassmannian, and algebraic curves. In the final part of the book, Richard Ward explores the connection between integrability and the self-dual Yang-Mills equations, and describes the correspondence between solutions to integrable equations and holomorphic vector bundles over twistor space.

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164,40 €

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Lieferfrist: bis zu 10 Tage

Artikelnummer: 9780198504214

Medium: Buch

ISBN: 978-0-19-850421-4

Verlag: OUP Oxford

Erscheinungstermin: 01.05.1999

Sprache(n): Englisch

Auflage: Erscheinungsjahr 1999

Produktform: Gebunden

Gewicht: 394 g

Seiten: 148

Format (B x H): 161 x 240 mm

