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Titolo	Recent Developments in Structure-Preserving Algorithms for Oscillatory Differential Equations / / by Xinyuan Wu, Bin Wang
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Nota di contenuto	Functionally tted continuous nite element methods for oscillatory Hamiltonian system -- Exponential average-vector-eld integrator for conservative or dissipative systems -- Exponential Fourier collocation methods for rst-order differential Equations -- Symplectic exponential Runge-Kutta methods for solving nonlinear Hamiltonian systems -- High-order symplectic and symmetric composition integrators for multi-frequency oscillatory Hamiltonian systems -- The construction of arbitrary order ERKN integrators via group theory -- Trigonometric collocation methods for multi-frequency and multidimensional oscillatory systems -- A compact tri-colored tree theory for general ERKN methods -- An integral formula adapted to different boundary conditions for arbitrarily high-dimensional nonlinear Klein-Gordon equations -- An energy-preserving and symmetric scheme for nonlinear Hamiltonian wave equations -- Arbitrarily high-order time-stepping schemes for nonlinear Klein–Gordon equations -- An essential extension of the nite-energy condition for ERKN integrators solving nonlinear wave equations -- Index.
Sommario/riassunto	The main theme of this book is recent progress in structure-preserving algorithms for solving initial value problems of oscillatory differential

equations arising in a variety of research areas, such as astronomy, theoretical physics, electronics, quantum mechanics and engineering. It systematically describes the latest advances in the development of structure-preserving integrators for oscillatory differential equations, such as structure-preserving exponential integrators, functionally fitted energy-preserving integrators, exponential Fourier collocation methods, trigonometric collocation methods, and symmetric and arbitrarily high-order time-stepping methods. Most of the material presented here is drawn from the recent literature. Theoretical analysis of the newly developed schemes shows their advantages in the context of structure preservation. All the new methods introduced in this book are proven to be highly effective compared with the well-known codes in the scientific literature. This book also addresses challenging problems at the forefront of modern numerical analysis and presents a wide range of modern tools and techniques.