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Autore	Borinsky Michael
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Descrizione fisica	1 online resource (xviii, 173 pages) : illustrations
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Disciplina	530.143
Soggetti	Physics Graph theory Elementary particles (Physics) Quantum field theory Mathematical Methods in Physics Applications of Graph Theory and Complex Networks Graph Theory Elementary Particles, Quantum Field Theory
Lingua di pubblicazione	Inglese
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Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Graphs -- Graphical enumeration -- The ring of factorially divergent power series -- Coalgebraic graph structures -- The Hopf algebra of Feynman diagrams -- Examples from zero- dimensional QFT.
Sommario/riassunto	This book is the first systematic study of graphical enumeration and the asymptotic algebraic structures in perturbative quantum field theory. Starting with an exposition of the Hopf algebra structure of generic graphs, it reviews and summarizes the existing literature. It then applies this Hopf algebraic structure to the combinatorics of graphical enumeration for the first time, and introduces a novel method of asymptotic analysis to answer asymptotic questions. This major breakthrough has combinatorial applications far beyond the analysis of graphical enumeration. The book also provides detailed examples for the asymptotics of renormalizable quantum field theories, which

underlie the Standard Model of particle physics. A deeper analysis of such renormalizable field theories reveals their algebraic lattice structure. The pedagogical presentation allows readers to apply these new methods to other problems, making this thesis a future classic for the study of asymptotic problems in quantum fields, network theory and far beyond.
