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This volume is the outcome of a CIRM Workshop on Renormalization and Galois Theories held in Luminy, France, in March 2006. The subject of this workshop was the interaction and relationship between four currently very active areas: renormalization in quantum field theory (QFT), differential Galois theory, noncommutative geometry, motives and Galois theory.

The last decade has seen a burst of new techniques to cope with the various mathematical questions involved in QFT, with notably the development of a Hopf-algebraic approach and insights into the classes of numbers and special functions that systematically appear in the calculations of perturbative QFT (pQFT). The analysis of the ambiguities of resummation of the divergent series of pQFT, an old problem, has been renewed, using recent results on Gevrey asymptotics, generalized Borel summation, Stokes phenomenon and resurgent functions.

The purpose of the present book is to highlight, in the context of renormalization, the convergence of these various themes, orchestrated by diverse Galois theories. It contains three lecture courses together with five research articles and will be useful to both researchers and graduate students in mathematics and physics.

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