Preface

This volume presents most contributions given at the School "Noise of frequencies in oscillators and the dynamics of algebraic numbers" which was held in Chapelle des Bois, Jura (France) from 5 to 10 April 1999. The event was made possible by the full support of the thematic school program of the Centre National de la Recherche Scientifique in France.

Noise is ubiquitous in nature and in man-made systems. For example, noise in oscillators perturbs high technology devices such as time standards or digital communication systems. The understanding of its algebraic structure is thus of vital importance to properly guide the human activity.

The book addresses these topics in three parts. Several aspects of classical and quantum noise are covered in Part I, both from the viewpoint of quantum physics and from the nonlinear or fractal viewpoint. Part II is mainly concerned with noise in oscillating signals, that is phase or frequency noise and 1/f noise. From a careful analysis of the experimental noise attached to the carrier the usefulness of the number theoretical based method is demonstrated. This view is expanded in Part III, which is mathematically oriented. In conclusion, the noise concept proved to be a very attractive one gathering people from at least three scientific communities: electronic engineering, theoretical physics and number theory. They represented an original mixture of talents and the present editor acknowledges all authors for their patience and open-mindedness during the school. Most manuscripts are comprehensible to a large audience and should allow readers to discover new bridges between the fields. We ourselves have identified but a few.

The meeting was followed by a small workshop sponsored by M. Waldschmidt at the Institut Henri Poincaré in Paris on 3 and 4 December 1999: 'Théorie des nombres, bruit des fréquences et télécommunications '. The purpose here was to emphasize the newly discovered link between the Riemann zeta function and communication systems. Some papers and related material are available at the address: http://www.archetypo.web66.com, a new URL site built by Matthew Watkins and devoted to the relationship between prime number theory and physics.

Besançon, April 2000   *Michel Planat*