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Overlapping of Mathematics and Humanities

edited by
Bruno Carbonaro and Alessio Russo

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Mathematics subject classification

• Mathematics: revelation of forms: **00A99**, **03A10**, **97A40**, **97E20**.

• Note sparse per un libro su Matematica e Letteratura: **00A99**, **97C50**.

• Novels which are proofs of a theorem: an example: **00A99**, **97E40**, **97C50**.

• Postmodern modernity of Nietzsche in didactics of mathematics: **00A99**, **97E20**.

• Modelli matematici di storie d'amore: **34C23**, **34C25**, **34C28**, **34C60**, **37G35**.

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• Ultrametric spaces in cognitive and psychoanalytic theory: a shared focus on representations and emotions: **82C32**, **11K41**.

• Modelli matematici per la musica scritta, eseguita e percepita: **00A65**, **37M10**, **91E10**.

• On kernels of finite semigroups: **20M07**, **20M10**, **20M17**, **20M18**.

• Hempel's Raven Paradox: defusing an alleged lacuna in the standard Bayesian solution: **00A69**, **03A05**, **97E20**.

• Uno studio sull'intergrazione dei migranti nella provincia di Caserta basato su tecniche di analisi di dati categorici: **97K80**.

Preface

Mathematics is traditionally considered as an arsenal of linguistic and logical tools to describe a number of *suitably defined* features of empirical world and to express and check our predictions about it. Here, by "empirical" we mean *perceivable with our five senses*, and such that our sensations can be replaced by *measures*, i. e. by real numbers, and our predictions by functional relations between variables (classes — or kinds — of possible different measures). This conception is both the origin and the consequence of the historically acknowledged link between mathematics and the so-called *hard* (or *exact*) sciences (typically, physics, chemistry and some branches of biology).
But the development of mathematics itself shows that this conception is mistaken, or at least too restricted. Even a quick and superficial glance at the explosion of new mathematical notions and theories from the late XIX Century to nowadays can easily convince any sufficiently interested and open mind that the basic conceptual tool of mathematics is not quantity, but form. This leads us to acknowledge that mathematics is in fact the whole system of "formal" ways of describing the world under *all* of its aspects, where the word "formal" should not be meant in Hilbert's sense of "purely syntactical", but in the larger sense of "based on an accurate definition of all the notions of interest emerging from *any kind* of experience and of the rules of thinking about them". This also explains the origin of the now ever more diffused conviction that a mathematically well-educated mind can tackle any intellectual task.
Conversely, some intellectual activities usually considered as far from mathematics, and based on ways of thought very different from the mathematical one, turn out to have a common root with mathematics, and to be useful to express by captivating, emotional languages mathematical truths.
Starting from the above remarks, this volume aims to offer the reader a sample of different interventions of the mathematical way of thought into the studies and the activities usually ascribed to the world of "humanities", from literature and educational theory to psychology, music, complexity of languages, social analysis and philosophy of science.

We hope to have given a sufficiently clear and convincing picture of the power of mathematics in unsuspected fields, as well as its universal character and its deep affinity with any other interpretation of reality.
We also need to express our sincere thanks to the Authors who have kindly contributed to this volume, and to our young co-worker and friend (formerly pupil) Dr Marco Menale, who, with a patient and careful work, has been able to give the text its final form.

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