Preface to the volume MB-15

The content of this book is divided into two parts.

Part one is devoted to the General Euclidean Algorithm elaborated by the author and published for the first time in Pacific Journal of Mathematics in 1984, known as "Baica's General Euclidean Algorithm".

Historically, the problem started with the so-called Hilbert's tenth problem. Hilbert's goal (Zahlbericht) was to determine a universal algorithm by means of which the open problems in Algebraic Number Theory of n-dimensions could be solved.

These problems solved in quadratics from the periodicity of the Euclidean Algorithm remained open problems in higher dimensions. They are :

1. General Simple Continued Fractions Algorithm known as Hermite's problem.
2. An n-dimensional equivalent of Euler-Lagrange Theorem from quadratics.
3. Dirichlet's problem.
4. The solution of Galois' Theory of polynomials problem.
5. An algorithmic approximation of irrationals.
6. n-dimensional Fibonacci numbers.
7. Fermat's Last Theorem problem.
8. The only algorithmic explicit solution of Hilbert's tenth problem.

Baica's General Euclidean Algorithm, described in the chapter II of this book, solves all of the above mentioned problems (chapter III) and terminates the efforts of a sequence of the most distinguished mathematicians who were looking for their solutions. They are: Euler, Lagrange, Gauss, Hilbert, Jacobi, Perron, Hasse and Bernstein. Their points of view were described in chapter I.

All the previous known algorithms developed by Euclid, Jacobi, Perron and Hasse-Bernstein were restricted to real numbers. Baica's main idea was to consider complex numbers, which leads to the invention of the General Euclidean Algorithm. It was for the first time that the complex numbers were used and the result, Baica's General Euclidean Algorithm, turns out to be the Euler System of the Algebraic Number Theory (chapter IV section 7).

Other applications of Baica's General Euclidean Algorithm are presented in chapter IV.

This first part is advised to be used by researchers in mathematical and computer sciences, doctorands, postgraduates and eminent graduate students.

The second part, introduced at the request of the editor in chief, is dedicated to mathematical modeling of the estimation of the energy-ecologic efficiency in the thermopower plants.

Mircea Cârdu gave the technical aspects of this research and the mathematical models leading to the final results belong to the author of this book. Using a statistical model we obtained a pollution indicator, which is refined to reach optimal results (chapter V).

This part is advised to be used by diplomat engineers, physicists, biologists and every specialist involved in ecological activities.

By publishing this book I am honored to place on record my gratitude to my late doctoral research advisors, Jürgen Schmidt, Helmut Hasse and Leon Bernstein. They encouraged me to extend my research beyond my dissertation, which finally brought me to prove Fermat Last Theorem.

These results could not be possible without the continuous support and understanding of my husband Adrian.

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I am grateful to Mircea Cârdu, that gave me the opportunity to enter the pollution subject, for our interesting and fruitful teamwork.

My thanks are also due to assistant Bogdan Căruntu for his much-appreciated help by carefully taping the manuscript.

All authors' results contained in this book were published in prestigious reviewed professional journals and are quoted in the references.

Timişoara, 6 August 2000

Malvina Baica