"Influence, create, increase! The country clears to light."
(Hass, alkoss, gyarapits! A haza fényre derül". - Kölcsey F.)

# Preface to the series MB

Lectori saluted! The kind reader begins to study the first volume of a new series. Worthy to look at the *present circumstances* of this starting: a) the series MB with matters b) from the *Applied & Computer Mathematics* (ACM) is starting onto its way c) just in the *Millecentenary Year* (MCY) of the *Hungarian Conquest* (HC) in the *Danube Basin* (DB), d) by our Pannonian society PAMM e) having its *Centre* at the *Technical University* of Budapest (TU-Bp), f) namely as *Inter university Network* (IN) in Central Europe g) at my Editor in Chief's (ECh) activity and h) printed by the *Publisher* of (TU-Bp). These brought along - inevitably - the mentioned starting and will yield - hopefully - the birth of many booklets till the *Millenary Year 2000 of the Hungarian State* too.

Useful to consider the *past circumstances* of the 28 years old life of PAMM: a) its rich *working experiences,* b) the professional-amical *cooperation* in its suitable frame IN *by engineers-mathematicians* etc. c) arrived mostly *from the* DB*'s universities* of technics and sciences, d) the PAMM's periodical *"Bulletins for Applied Mathematics"* (BAM) with its 1200 papers in 79 volumes from about 2800 lectures of 116 Conferences (PC), e) the *Pannonian traditions*, e.g. the pleasant, friendly, useful, thinking, creative, mobil lifestyle, f) the cultural-scientific *impressions* obtained *in the* PC*'s Hungarian cities* and universities (e.g. Bp. B.füred, B.almádi, Göd, Veszprém, Miskolc, Debrecen, Szeged, Pécs, Sopron, Győr, Baja, etc.), g) similar and greater impressions in the PC's *European ones* (e.g. Kosice, Krakow, Wien, Belgrade, Rijeka, Trieste, Cluj, Timisoara, Istambul, Athene, Roma, Paris, London, etc.), h) on these traces, the PAMM's international *"foreguard"* (with young professors and colleagues) and its international *"governing board"* (in numerous committees, with respected rectors, deans, directors of inst, professors) *as motors* of planning and acting in the PAMM's multilateral life etc. After such precedents, it was *almost natural* - in this festive MCY still better - the starting of MB, namely *beginning the* authorial works for about 26 *initial volumes* at my *ECh's activity* (with earlier experiences from the series "Practice in Engineering Mathematics" (PEM in 23 vol., 4 edit./vol.) and from the periodical BAM in 79 vol. Etc.)

Of course, *the* MB *'s purpose* is drawn clearly. Each booklet must intend a) to give a *survey* - in the present situations of the ACM's special (scientific) literature - *on the small domain* choose by the author, b) to build *in the author's scientific results* got in these domain (e.g. new theorems or developments, recent methods or algorithms for know tasks etc.), c) *numerical examples and computing ones,* possibly with programs, d) to show *various applications* of this ACM-domain in the modern technical, physical, economical, biological, medical etc. sciences. Obviously, there is talking about *scientific booklets* for special experts, but *not* about *ordinary lecture notes* for graduate students.

*For which readers are recommend these booklets?* It follows from the former purpose, that these are written and proposed *for dipl. engineers, physicists, economists, biologists, physicians,* moreover for such doctorands, postgraduates, lecturers, occasionally for eminent graduate student too.

*This reading public* wishes really *various mathematics applied in technics, physics, economics, biology, medicine* and *counted* in such tasks *by computers* at their rich languages and programs. These public *respects the pure mathematics, but utilities them only together with applications and computers.* - *Our* PAMM-*authors* - working in various countries, cities, universities, faculties, branches - *will produce generally a balancing* among the mathematical, computer and applying (e.g. Technical) sciences, but some booklets will be made - occasionally - with an *overweight* of one side from the triangle ACM. Obviously, such medial and external booklets *can occur* alike in a such series. Only *the enthusiasm of this inter university professional cooperation* is the sole common property of our PAMM-authors and just the same one *promises useful reading matters* for you, kind Reader! If you *find* so at this volume, that our former promise is fulfilled, please, *read* our following booklets too!

Necessary to express our *best thanks to Sir Vice Rector Prof. Dr. G. Gordos* for his excellent assistance to buy and develop the PAMM *'s Computer System* and *to starting* of these series MB, moreover to *Sir Dean Prof. Dr. J. Zobory* for his durable aiding to open and furnish *the new, separate* PAMM-*Centre,* just the *birthplace* of the series MB.

Vale, nosher Lector et Collegial!
Farewell is nodded friendly for you by the ECh:

Budapest - Göd, 12th October 1996

Prof. Dr. F. FAZEKAS

- A pleasant task to express - now, in the 7th MB - year - our distinguished thanks to *sir Vice Rector Prof. Dr. Gy. Horvay* and to *sir Prof. Dr. I. Zobory, f. Dean* for their continuous & multilateral assistance in *further development* of our computer system, MB-series (till now with 28 published volumes), furniture of PAMM-centre, conferences of PAMM (till now 142, there with systematic celebration of our ardent MB - authors) etc. consequently, our *purpose* for the future: to *continue* further our creative activity.

Budapest - B.almádi, Summer 2003

Prof. Dr. hc. F. FAZEKAS
decorated by Pal. József Medal

## *Autobiography of Francis Fazekas (in 2005)*

Birth: 1922, Csenger. - Middle schools: from 1933; final exam.: 1941. -Technical University of Budapest (TU-Bp): from 1941; Dipl. Mech. Eng.: 1947.

From 1948 up to date: activity at TU-Bp; Dept. of Math.: assistant, sen. lecturer, associate professor, since 1983 senior researcher scientific (also today). From this year, the head of PAMM-Centre at the Dept. of Transp. Automatics.

dr.tech: 1965, TU-Bp; Dr. Math. Sci.: 1968, U-Novi Sad.

Travels in Europe (to conferences, with lectures) till now: about 55 (e.g. Bruxelles, Aachen, Zürich, Moscow, Wien, Prague, Weimar, etc.).

Pannonian Appl. Math. Meeting (PAMM), founded by me in 1969; till now 118 Conferences, whose 28 in foreign countries (e.g. In Belgrade, Istanbul, Athene, Roma, Paris, London, etc.).

Publications, mostly on matrix methods, diff. equations, dyn. systems, stochastic, diff. geom.: about 150 papers (in ZAMM, ISNM, KF, BAM etc.); about 15 univ. lecture notes & bulletins. - Editor of Practice Eng. Math. in 23 vol., mean 4 edit./vol., till 1980; from these 10 vol. written by me. - Editor of PAMM's Bull. of Appl. Math. (BAM) since 1971; till now 80 vol. with 1300 papers.

- Editor in Chief of PAMM's MB, started in former year, beginning the authorial works for 26 volumes and publishing quickly 2 booklets, then newer 2 ones in this year from them too.

Decorations: Memorial Medal from TU-Kosice (1994), and from TU-Bp (1997, Summer), Honorary Diploma from U-Novi Sad (1997), „Golden" Diploma from TU-Bp (1997, Autumn), „dr. honors causa" Diploma from the Ovidius University of Constanta (2000, Autumn), Honorary Diploma from the A. Vlaicu University of Arad, „József Nádor Emlékérem" Memorial Medal, Diploma & Price from BUTE, Budapest (2002, Summer), Golden Necklace of PAMM (2003, May).

Parliament (on the Danube bank of Pest)

## *Autobiography of Aldo PERETTI*

Peretti, Aldo, dipl. Industrial Eng. Mathematician, researcher, educator; b. Buenos Aires, Argentina, 1932. Baccalaureate at College National Mariano Moreno, Buenos Aires, 1949, Graduate school at the University de Buenos Aires 1950 – 1957. Professor at Univ. de Bs. As. University Technological National 1, University de Belgrano, University Catholic Argentina, University del Salvador.

At present Professor at University J. F. Kennedy Founder and Editor of "Bulletin of Number Theory and Related Topics" 1974 - 1993. The "Bulletin" was delivered by subscription or exchange in many university libraries and countries of the world.

Of the many papers published in the "Bulletin" over the years, 80% were commented in the "American Mathematical Reviews" and 70% were reviewed by "Zentralblatt für Mathematic".

He is author of more than 70 papers, most of them concerned with centennial problems in Analytic Number Theory.

## *Autobiography of Malvina BAICA*

Baica, Malvina, mathematician, researcher, educator; b. Oravita, Banat, Romania, nov. 3, 1942. Came to U.S. 1968, naturalized 1973; d. Adam and Cornelia (Stefan) Bunghiu; m. Adrian Baica, sept. 14, 1963.

B.S. in Math. And Physics, U.Timisoara, Romania, 1964. M.S. in Math. 1965. III. Inst. Tech., Chicago 1974. Ph. D. in Math., Univ. Houston, 1980. Ass.Prof. Western III. Univ., Macomb, 1978 – 80. Marquette Univ., Milw., 1980 – 81. Marshall Univ., Huntington, W. Va., 1981 – 83. Valparaiso (Ind.) U., 1983 – 84. U. Wisconsin – Whitewater 1984 – 1995, Assoc.Prof.U.Wis. – Whitewater, 1989 – 92 and Prof.., 1992 –.

Author of 50 articles and two books on Algebraic Number Theory and Number Theory. Recipient U. Wis. Excellence in Research Award, 1998. Mem. N. Y. Acad. Scis., and American Mathematical Society.

Achievements include development of a new algorithm in a complex felt which turned out to be the Generalized Euclidean Algorithm and Euler System of the Algebraic Number Theory known as Baica's Generalized Euclidean Algorithm (BGEA) used to approach unsolved problems of Algebraic Number Theory including the original Euclidean Fermat's Last Theorem, discovery of Baica's trigonometric identities, research in Algebraic Number Theory and Analytic Number Theory.

This book presents several collected papers of the authors, concerning some famous old problems in Analytic Number Theory.

The book contains twelve chapters.

In **Chapter 1**, a proof for Riemann hypothesis concerning the zeta function as given. The method is readily generalized to the L-series so that the Extended Riemann Hypothesis for many other Dirichlet series and functions is proved.

In **Chapter 2**, an alternative proof of the hypothesis through the use of the $N(\sigma,T)$ function is given.

In **Chapter 3** we present an attempt to give a "Solution of Goldbach's conjecture" very nearly as it was given for a million U.S. dollar contest. Some typographical errors are corrected and the proof is shown to be true for every even number greater tan $10^{75}$.

In **Chapter 4**, "Clarifications" some more explanations of the previous chapter are given, and with some modifications of the main lemma an improved version is given such that the conjecture is valid for every number greater $10^B$, with $60 < B < 70$.

Also a survey of these two previous results are given.

In **Chapter 5**, some remarks about the results in Chapters 3 and 4 are given, after Peretti's results on the Extended Riemann Hypothesis were published.

In **Chapter 6**, "The Binary Goldbach Problem", we improve the results of Chapter 4, and prove that the conjecture is valid for every even number greater than $10^{50}$. Of course, the proofs is rather involved, because of the difficulties of the subject.

Due to this fact, in **Chapter 7**, "An abridged method to derive the asymptotic formula for the Goldbach decompositions", thanks to the introduction of a Tauberian theorem, the proof is abridged to only three pages.

The preceding papers on Goldbach's conjecture rely on a formula developed by Hardy and Littlewood assuming validity of the Extended Riemann Hypothesis for the L - Series in the first two chapters.

The twin prime problem, that asserts that there are infinitely many primes with a constant difference k, is closely connected with the Goldbach problem. Hardy and Littlewood called them conjugate problems. In order to arrive to their formula for the quantity of prime pairs less than x, they required the use of three hypothesis. Hence the problem was considered as hopeless.

In **Chapter 8** this problem is proved in six pages, with remainder term for the Hardy-Littlewood conjectured formula.

**Chapter 9** solves an old problem that goes back to Euler: does there exist a parallelepiped with integral edges, integral diagonal in its faces and integral inner diagonal ?

Such parallelepiped was named by Euler as "perfect cuboid". The question has given rise to a copious literature and computation. Here, it is proved in nine pages of straight forward calculations that no such a cuboid exists.

In **Chapter 10**, using some of the former results, is deduced the value of the singular series of the generalized Fermat equation, with application to other equations.

In **Chapter 11,** some primes of the form $p^k = x_1^m + x_2^m + ... + x_r^m \leq n$ are discussed.

In **Chapter 12,** some triplets and other sequences of primes are considered.

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

The results in this book are based on professor's Aldo Peretti life long and hard work about these problems, work which was published in some of his important papers in this matter. In the AMS reviews 81b: 10024a and 81b:10024b of his 1978 papers regarding ~-function, the reviewer compared Peretti with Ramanujan "both papers are in the spirit of Ramanujan in the way that these formulas flow on, and it is surprising that Ramanujan did not find them himself'. As co-author, by writing this book with him, I am honored to place on record my gratitude to one of the most distinguished mathematicians in this subject, Prof. Aldo Peretti, without his generous help, advice and encouragement 1 could never have begun to work on these challenging problems.

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

The publication of this book became possible with the financial support of the University of Wisconsin-Whitewater, U.S.A., given by the dean of the college of letters and science Howard L. Ross; the dean of graduate studies Lee Jones; the chair of the mathematical and computer sciences department Bennette R. Harris and the encouragement and advises of my friends, professors Drs. Nicolae Boja, Borislav Crstici, Octavian Lipovan and Richard Schauer.

To all of them I address my warmest thanks.

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

The authors are grateful to their readers for any constructive comment or observation about these results.

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