

The 90th Birthday of Professor Constantin Corduneanu

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Constantin Corduneanu was born on July 26th, 1928, in the city of Iași, Province of Moldova, Romania, from the parents Costache and Aglaia Corduneanu. He obtained his Ph.D. in mathematics from Alexandru Ioan Cuza University (AICU) in 1956 under the supervision of Professor Ilie Popa; his dissertation titled “global problems for first and second order nonlinear ordinary differential equations.”

In 1977 Constantin decided to expatriate from Romania, and reside in the United States of America (the US). He first went to Italy and taught some courses at the International Center for Theoretical Physics (UNESCO) in Trieste; he was only allowed to travel to Italy by the Romanian authorities. In January 1978, Constantin moved to the US and had a teaching position at the University of Rhode Island. He had been a visiting professor there in 1967-1968 and 1973-1974 academic years; hence familiar with the place and colleagues. In the academic year 1978-1979, he was a visiting professor at the University of Tennessee in Knoxville. Constantin obtained a tenured position as a professor in the fall of 1979 at the University of Texas in Arlington (UTA). V. Lakshmikantham was the Chair of the Mathematics Department at the UTA. He brought Corduneanu to strengthen the mathematics doctoral program. He also brought several other well-known mathematicians. In 1987, the American Mathematical Society ranked the department of mathematics at UTA as 89th out of 620 mathematics doctoral-granting institutions in the US. Professor Corduneanu made significant contributions in the department’s achievement of that ranking. Professor Corduneanu has been there ever since and retired in September 1996, after 47 years in higher education in Romania and the US, holding the title of Emeritus Professor of Mathematics.

I had the opportunity to meet Professor Corduneanu for the first time in my life at the International Conference on Theory and Applications of Differential Equations held in Columbus, Ohio, in March 1988. Professor Reza Aftabizadeh from Ohio University, a former student of Corduneanu, organized this conference and I was his assistant. I had already taken two semesters of differential equations with Aftabizadeh, and he used Corduneanu’s book, Principles of Differential and Integral Equations for the first semester. In that meeting, I asked Professor Corduneanu to be my doctoral advisor and, after I told him that I had taken all the required courses like Real Analysis, Differential Equations, etc., he agreed. I transferred to the UTA



Figure 1: Corduneanu lecturing

in 1988. I did not know anybody there. Corduneanu and his wife, Ms. Alice, deceased in 2005, gave me a room in their house until I found an apartment after two weeks. Every year the Corduneanus invited me to their house for Thanksgiving and Christmas and treated me as if I were their son. They did not have children. I never forget their kindness and generosity.

Upon my arrival, Corduneanu gave me the manuscript of his book *Integral Equations and Applications* and asked me to read it. My Ph.D. dissertation was based on the materials of this book which was published by the Cambridge University Press in 1991. Professor Corduneanu organized a research seminar during the period September 1990 to May 1994, in the department. All of his students attended the seminar and presented their research work. Faculty members were also attending the seminar. Visitors occasionally participated and presented their research results, including V. Barbu, Y. Hamaya, M. Kwapisz, I. Gyori, and Cz. Olech.

Corduneanu has been well-liked and respected by all faculty members in the department. They called him affectionately C. Professor Corduneanu has always assisted everybody, students, faculty members, and mathematicians he met for the first time. He has been intellectually generous to all. Late professor Bernfeld whose specialty was also differential equations always told me that he was so amazed by Corduneanu's vastness of knowledge in differential equations. He mentioned that anytime he went to Corduneanu and asked him a question, he would be referred to a specific paper in a particular journal which would provide the answer to his question.

Professor Corduneanu taught numerous courses, and his classes were always fully attended, including by many engineering students. He was very popular and respected among students, and they all wanted to take his classes. All doctoral students wished to have Corduneanu as a member of their oral comprehensive examinations or as a member of their dissertation defense committee because he was helpful, supportive, and kind to all. He did his utmost to help the students answer-

ing their questions, guiding them, and advising them on what books or papers to read.

Corduneanu was the founding editor of the journal *Libertas Mathematica*, a publication of the American Romanian Academy of Arts and Sciences. He published the first volume in 1981 and continued this task until 2011. From 1990 to 1994, Li and I assisted him in the publication of this journal. We were doing most of the preparation of the journal, copying pages, pagination, collating, and organizing; we submitted the last stage of the work to a publishing shop for binding the journal. After long hours of work on Fridays, Saturdays, and Sundays, Corduneanu would take us to Cici's Pizza, a pizza joint close to campus that had a buffet, and we had lunch or dinner there.

In May 1990, Corduneanu along with faculty members from the engineering department organized the Integral Methods in Science & Engineering conference at the UTA. In May 1996, Corduneanu along with several other faculty members, including faculty from engineering, organized the Volterra Centennial Symposium, at UTA, about 100 mathematicians and engineers from 15 countries attended this conference and presented their results. In January 2000, Corduneanu and I organized a special session on "Integral Equations and Applications" for the American Mathematical Society at the Joint Mathematics Meetings held in Washington, D. C. We invited 25 mathematicians from various countries and the US to present talks.

Professor Corduneanu presented over 140 papers at various meetings and conferences on mathematical topics, held in Romania, Hungary, Czechoslovakia, Bulgaria, Soviet Union, Russia, Ukraine, Germany, Belgium, Italy, The US, The Netherlands, England, Scotland, Japan, Canada, France, Morocco, Greece, Poland, China, Portugal, and Chile. He has been invited to present his research work at over 31 national and international conferences. Corduneanu has been an invited lecturer at 53 Colloquium and Exchange Programs in various countries outside of the US. From 1968 to the present, he has been an invited lecturer at 36 universities in the US. Authors around the world have quoted Corduneanu's work in over 110 books, monographs, and textbooks.

Corduneanu has attended more than 100 national and international conferences, had short visits and gave talks about his research work in over 60 universities or institutes, in over 20 countries including Russia, Ukraine, Germany, England, France, Italy, China, Japan, Hungary, Poland, Portugal and Chile. He has published over 200 research papers during the last 66 years, including 7 books in a total of 15 editions with the following publishers; Romanian Academy, Academic Press in New York, Springer Verlag, Cambridge University Press, The Taylor and Francis Publishing House in London, John Wiley & Sons in New York, Allyn & Bacon in Boston.

During the last 52 years, Corduneanu has been on the editorial board, either as



Figure 2: Corduneanu at Mahdavi's residence. We were working on our book, 2011

an editor or an associate editor, of at least ten mathematical journals from Romania, the US, South Korea, Israel, and Ukraine.

Corduneanu's research contributions during his career in the US are:

Theory of Integral Equations

In this field, his contributions include generalizing the method due to Massera and Schaffer, from differential equations to integral equations. His book *Integral Equations and Applications* by Cambridge University Press, 1991, contains the basic results he has obtained until 1987. This book became one of most often quoted references in the literature. In this book Corduneanu illustrated that integral equations constitute a very useful and successful tool in contemporary research, unifying many particular results available for other classes of functional equations (differential, integrodifferential, delayed argument). Also, his book *Integral Equations and Stability of Feedback Systems*, published in 1973 by Academic Press, contains qualitative results with application to the stability of systems with automatic control.

Equations with Causal Operators

Corduneanu has aimed to present, as much as possible, a unified theory, of equations with causal operators according to Volterra-Tonelli-Tychonoff, which covers the classical types of ordinary differential equations, equations with delay, integrodifferential equations with Volterra type integral, and some discrete evolution equations. The book "Functional Equations with Causal Operators," published by Taylor & Francis, 2002, contains these topics. This book covers research conducted by Corduneanu, as well as joint works with Mehran Mahdavi and Yizeng Li, his former students. Corduneanu, Li, and Mahdavi's book titled *Functional Differential Equations: Ad-*



Figure 3: Corduneanu and Mahdavi at Baltimore Washington International Airport, 2011

vances and Applications, published by Wiley in 2016, also is dedicated to this type of equations and their connection with the classical kinds of equations.

Fourier Analysis (Generalized)

A vast number of problems have been investigated in this field for more than fifty years. Corduneanu has made significant contributions to oscillation theory and oscillation theory with particular regard to the almost periodic behavior of solutions to various classes of nonlinear equations. The books “Almost Periodic Oscillations and Waves” published by Springer in 2009 and “Almost Periodic Functions” published by John Wiley in 1968 are concerned with this subject.

Corduneanu has received numerous awards, here I mention those he received during his career in the US:

Honorary Doctor, University of Ekaterinburg, Russia, 2010; Honorary member of the Mathematical Institute of the Romanian Academy, Bucharest, 2005; Doctor Honoris Causa, University Stefan cel Mare, Suceava, Romania, 2003; Best paper award, CASYS’03, Liege, Belgium, 2003; “V. Pogor” Prize of the Municipality of Iași, 2002; Medal of Merit in Mathematics from the Union of Czech Mathematicians, 2001; Doctor Honoris Causa, Transylvania University, Brasov, Romania, 1999; Doctor Honoris Causa, University of Iași, Romania, 1994; Doctor Honoris Causa, University “Ovidius”, Constantza, Romania, 1994; Distinguished Research Award, University of Texas at Arlington, 1991.

Professor Corduneanu has been a member of the American Mathematical Society; Society for Industrial and Applied Mathematics; Mathematical Association of

America; American Romanian Academy of Arts and Sciences; Romanian Academy, and Federation of Nonlinear Analysts.

In honor of Corduneanu's 90th birthday, the University of Urals, at Ekaterinburg, Russia, held a conference in August 2018. They intend to translate our book "Functional Differential Equations: Advances and Applications" into Russian.

Corduneanu and I have been collaborating for more than 28 years. I have been so fortunate in my life to have known Constantin Corduneanu; an outstanding mathematician and more importantly a decent, kind, generous, and a honorable man, who has helped me grow intellectually and be who I am today.

Professor Corduneanu has guided and assisted the research work of the following students in the US:

Marica Lewin, C. P. Tsokos, A. N. V. Rao, S. Travis, D-Ph. K. Hsing, Reza Aftabizadeh, and W. Layton.

Professor Corduneanu was the Ph.D. advisor of the following students in the US: Hushang Poorkarimi, Mohammad Hadi Moadab, Ali Ansari, Mehran Mahdavi, Yizeng Li, and Zephirinus Okonkwo.

Dear Professor Constantin Corduneanu, Happy Birthday to You!

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