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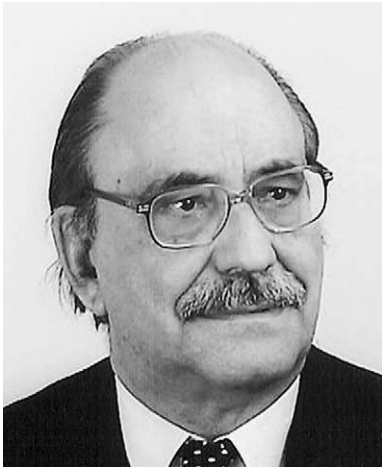
Dedication



Graciano de Oliveira was born on May 7, 1938, in Cabanas de Viriato, a small village in the center north of Portugal. During his youth, his family moved frequently, so for his primary and secondary studies he attended schools successively in Aveiro, Lisbon, Sá da Bandeira (now Lubango, Angola) and Coimbra. In 1956 he entered Coimbra University, where he graduated in Mathematics in 1961 with high marks. He then became a university assistant, first at Coimbra and later, for a period, at the University of Lourenço Marques (now Maputo, Mozambique). From 1966 to 1968 he was in Oxford (England) with a scholarship.

Starting in the mid-1960s, Graciano de Oliveira became interested in problems concerning matrices, under the influence of Luís de Albuquerque (later a renowned

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historian of Mathematics and Nautical Science), who had spent a year in Germany studying stochastic processes and the associated stochastic matrices. While in England, Graciano de Oliveira met in Sheffield with Hazel Perfect, a well-known expert in matrix theory.

In 1969 Graciano de Oliveira obtained his doctorate in Coimbra with a thesis entitled "On stochastic and doubly stochastic matrices". Shortly afterwards, he wrote a document criticizing the organization of scientific research in Portugal. His university contract was not renewed, and he spent the next few years in Lisbon and Coimbra, doing research with scholarships from the Gulbenkian Foundation. In 1971 he went for a while to Recife (Brazil) as a full professor at the Federal University of Pernambuco.

Between 1972 and 1976, Graciano de Oliveira was a researcher at the University of Lisbon, working with several former Coimbra students (Russell Merris was a visitor in 1973–1974). In 1976 he became a professor at the University of Coimbra, where he stayed until his retirement in 2002, save for visiting professorships at the University of Campinas (Brazil) in 1982, at the University of Lisbon from 1986 to 1988, and at the University of Macau (China) from 1989 to 1992.

Graciano de Oliveira's main research interests lie in matrix theory and multilinear algebra.

He has published extensively on inverse problems and existence conditions for matrices in a given class with prescribed features, usually concerning invariants of some kind (e.g. the characteristic polynomial, the spectrum, the elementary divisors), a type of problems for which he acknowledged the influence of Leon Mirsky and his papers. He started by considering inverse problems for nonnegative matrices. From this topic, he went to the more general theme of inverse eigenvalue problems, starting the tradition of this study in Portugal, pursued to this day by many people, in several countries.

Among the topics on which he worked, publishing several papers, were the classical additive and multiplicative inverse eigenvalue problems. However, the most striking results on the theme of inverse eigenvalue problems concern the problem of existence of matrices with prescribed characteristic polynomial and top left-hand corner. The work of Graciano de Oliveira on this question gave important insights for the subsequent study of inverse problems on invariant factors. High points include the discovery of the interlacing divisibility relations for invariant polynomials of matrices and principal submatrices, obtained by E. Marques de Sá in the late 1970s (and independently by R.C. Thompson), and the deep connections of this type of problems to questions in control theory, explored by Ion Zaballa in the 80s starting with his theorem on the completion of matrices with prescribed rows and invariant factors. Also very influential was Graciano de Oliveira's 1975 paper "Matrices with prescribed characteristic polynomial and several prescribed submatrices", which started a line of enquiry that eventually turned into a long-term program of research.

In multilinear algebra, Graciano de Oliveira focused on generalized matrix functions, a topic he surveyed during the academic year of 1971–1972 in a series of lectures at the Coimbra Ateneu for interested students. This course was the starting point for the research on multilinear algebra done in Portugal in the last thirty years. The corresponding lecture notes were later published in book form by the Gulbenkian Foundation, and are still an important reference in the field of generalized matrix functions. Research on conditions for equality of decomposable tensors, and generalizations thereof, led to deep results by J.A. Dias da Silva and others in the active multilinear algebra school at the University of Lisbon.

In these and other subjects, Graciano de Oliveira's enthusiasm has been infectious, leading and inspiring many people in Portugal and other countries. Problems he has proposed throughout the years (such as the well-known conjecture—also formulated independently by M. Marcus—on the determinant of the sum of two normal matrices) continue to be analyzed to this day. Many foreign mathematicians visited Portugal at his invitation in the 1970s and 1980s. He supervised eleven doctoral students: J.A. Dias da Silva, E. Marques de Sá, M. Emília Miranda, Ion Zaballa, Natália Bebiano, A. Leal Duarte, Antónia Duffner, Graça Marques, Isabel Cabral, Zhang Yu Lin, and Carlos Fonseca. He has served in the Editorial Board of the research journals *Linear Algebra and its Applications* and *Portugaliae Mathematica*. From 1993 to 1995 he was Vice-President of the International Linear Algebra Society.

Another passion of Graciano de Oliveira has been the Portuguese Mathematical Society. Throughout the years he held several posts in the Society, including President in 1986–1988 and 1996–2000. For many years he has made a persuasive effort in the Portuguese mathematical community to make it aware of the importance of quality teaching of mathematics in the secondary school. He currently serves as editor-in-chief of the journal *Gazeta de Matemática*.

Several of the papers collected in this issue reflect Graciano de Oliveira's influence. On the occasion of his 65th birthday, the editors wish to express their

appreciation for his work and lasting impression on Mathematics, especially matrix theory and multilinear algebra, in Portugal and many other countries.

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Eduardo Marques de Sá
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