

# José Rodrigues Santos de Sousa Ramos (1948–2007): The Diversity of Dynamical Systems

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**Abstract:** José Rodrigues Santos de Sousa Ramos, mathematician of great merit, passed away on January 1st, 2007, in Lisbon. He was buried in Sobral da Adia. His death was a huge loss for the development of mathematics in Portugal. The course of time will increase the dimension of this loss. Therefore, we dedicated this theme issue on Dynamical Systems to recall his memory and underline his work. We never forget you.

**Keywords:** Dynamical Systems, Symbolic Dynamics, José Sousa–Ramos

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This paper is dedicated to the memory of Professor José Sousa Ramos.

José Rodrigues Santos de Sousa Ramos, Pepe for his friends, born in Quarteira in 1948, he graduated in physics at the Faculdade de Ciências da Universidade Clássica de Lisboa where he also obtained his doctorate in Mathematics. From 1972 he was researcher at the Instituto de Física e Matemática and at the Centro de Física da Matéria Condensada, in Lisboa, at the Faculdade de Ciências da Universidade Clássica de Lisboa and, in the last fourteen years, he was professor at the Instituto Superior Técnico da Universidade Técnica de Lisboa.

In the memory of all the people that met Sousa Ramos it will last the noble nature of his human character made with extreme simplicity and modesty, as well as his overwhelming and systematic dedication to the students, day after day, or the memory of his delightful enthusiasm sharing his vast culture both in mathematics and physics. Moreover José de Sousa Ramos leaves a vast and remarkable written heritage, much richer than could suggest the mere counting of two hundred scientific papers in international magazines with referee. Most of his papers were in the field of discrete dynamical systems and, in particular, in symbolic dynamics.

The importance of the scientific work of José de Sousa Ramos lies in his great creative capacity and mental autonomy, sometimes putting him much ahead of his colleagues with original thoughts and afterthoughts, which, for precisely that reason, resulted in transgressive thinking and, naturally, ideas to be later polished. Nothing surprising for the people used to scientific reflection, and knowing that the scientific truth never erupts as a distilled potion and is, at first, a conquest made by using imperfect tools that will be perfected in the future.

We can say that José de Sousa Ramos created an actual school of mathematics, which is in itself a rare and notable achievement, like the one made half century back by the Portuguese eminent mathematician José Sebastião e Silva whose effects still last today.

The fifteen doctorates that José de Sousa Ramos supervised and the same number still in course at the moment of his death prove the vigor of his influence.

In 1989 he defended without supervisor, his Doctoral Memoir with the title:

**Hiperbolicidade e Bifurcação de Sistemas Simbólicos** in Faculdade de Ciências da Universidade de Lisboa in the speciality of Mathematical Methods in Mechanics.

Such Memoir was a compendium of some results mainly on the theory of discrete dynamical systems and

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**Fig. 1:** José Rodrigues Santos de Sousa Ramos

particularly in chaos theory. Many problems presented there were developed and extended during a long term and constitute the lines of research of the Portuguese Group on Dynamical Systems mainly located at Instituto Superior Técnico de Lisboa, particularly in what concerns the use of the symbolic dynamics to address problems on dynamical systems.

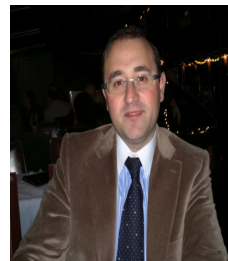
But previously to 1989, Pepe was working and obtained results in several fields. From the period 1974–78 on the discretization of space–time and its consequences on quantification and renormalization of the electromagnetic field and during 1976–82 on the singularities theory, catastrophes and their applications on the classification of elementary particles, structure of space-time, applications on fluids and critical phenomena. Also on control theory (1982–1988).

Pepe had an important background in Physics and Mathematics. In fact he said he had a “classical background” and defended “a way of personal behavior in life and in work”. This meant in science, following the line of understanding, clarifying, completing and polishing all the results obtain in mathematical research spending all the necessary time, and far from modern tendency of “immediate and quick” attempt to get publications.

With the publication of the present Theme issue we want to recall Pepe, his work and honor him.



**Francisco Balibrea** is Full Professor of Mathematical Analysis at University of Murcia in Spain. He founded more than 30 year ago the Dynamical System Group of the Region of Murcia. He has supervised more than 15 PhDs and writes more than 100 paper publish in the best research journal covering a wide range of topics of topological low dimensional dynamics and difference equations.



**Juan Luis García Guirao** is Full Professor of Applied Mathematics at Universidad Politécnica de Cartagena in Spain. In 2010, he became in the youngest Mathematics Full Professor in Spain with 33 years old. Author of more than 60 research papers published in the best journal he has supervised 4 PhD’s and more than 10 Master Thesis. He belongs to the Editorial Board of several journals, between them MATCH Commun. Math. Comput. Chem. ranked in first position of the JCR 2010 list (Interdisciplinary Mathematics).



**Clara Grácio** received his Diploma in Pure Mathematical in 1988 and the Master degree in Mathematics, specialization in Analysis and Differential Equations in 1994 at Faculdade de Ciências da Universidade de Lisboa and obtained a Ph.D. degree in Mathematics, at Instituto Superior Técnico da Universidade Técnica de Lisboa, Portugal in 2002. She is currently Professor at Department of Mathematics of ECT-Universidade de Évora, in Évora, Portugal. She is now Vice Director of Research Centre for Mathematics and Applications and member of the General Council of the University of Évora. Her research and teaching activities concern Mathematical Analysis, Hyperbolic Geometry, Chaos, Fractals, Nonlinear Dynamical Systems, focusing more particularly on the study of Chaos, Complex Networks, Synchronization and Applications.