AN INTERVIEW WITH

Luís Sanchez

by **Maria do Rosário Grossinho***

Having lived in Moura, Alentejo, his first 18 years, Luís Fernando Sanchez Rodrigues entered the Faculty of Sciences of the University of Lisbon in 1966 to study Mathematics in the variant then oriented towards Pure Mathematics. During his pre-university education, which he completed at the Liceu de Beja, his mathematics teacher, of whom he speaks with high regard, gratitude and tenderness, was determinant in his decision to study Mathematics.

Since the beginning of his studies in Lisbon, at the Faculty of Sciences, his commitment and dedication to Mathematics became noticed. After graduation, Luís Sanchez joined the staff of the Department of Mathematics and became full professor in 1990. In his academic activity, where naturally teaching and research have had a prevalent role, he values in a special way his role as coordinator of CMAF (2004-2015) and CMAFcIO (2015-2017). After a life dedicated to the Academia, his jubilation took place in 2018, which nevertheless did not put an end to his connection to the University.

But let us hear in first-hand what Luís Sanchez can tell us about his life journey.

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How about starting at the end: what is your general impression of your academic career? Which points would you underline as satisfying experiences?

It is a good idea to start at the end, since at ages like mine what is recent fades from memory more quickly. I see my professional path as a commitment to pass on a taste for the subjects I have taught, and to carry out research, whenever possible on a collaborative basis, either with more experienced colleagues or with younger people. I believe that the circumstances of my time provided me with a smooth career. I would highlight (1) the guidance of some master and doctoral theses (the starting point was with you), (2) the years 2004-2017 when I coordinated CMAF (and then CMAFcIO) and (3) the period until 2007 when I was part of the editorial board of *Portugaliae Mathematica*, in the recovery phase of the journal after a problematic phase — perhaps these are my most relevant contributions for the mathematical and academic community. I would like to express my gratitude to all the colleagues and collaborators with whom I have interacted in the various tasks of the profession: I consider myself a lucky man, since they were people with intellectual and human qualities that made collaboration very pleasant. Let us say that I have tried to teach well but I have also learned a lot from others.

You belonged to the Scientific Council of CIM until 2002. Since then, quite a few years have passed. How do you see the changes in Mathematics in Portugal over all these years?

Many years have passed, indeed. If I recall here the great investment in Science in Portugal since the mid 1990s, by the consistency of policies and increased funding, I will be going along with the common place. It should be underlined that not only were the new opportunities welcomed enthusiastically, but autonomous proposals emerging from the base proved to be fruitful. The creation of the CIM was an example, whose output I could appreciate through the initiatives involving several research centres. But if I remember that time, or if I go back even further — for example, to the years when I started preparing my PhD — what is most fascinating is to contemplate the evolution of mathematical production until the present, in which we have teams that consistently produce work that competes at international level in diverse areas of Mathematics.

It is good to hear descriptions like the ones you give in an optimistic tone, but isn't there another side of the coin? Is everything always so uplifting?

No, in fact not everything can be seen from an optimistic perspective. If we want to look at the problems, one of the most obvious in the current situation is that many talented researchers have no secure career prospects ahead of them, either due to the ups and downs of ministerial policies, or due to constraints in options of the institutions that host them, or even both causes together. Even more worrying, concerning our country, is the fact that the business world does not show much interest in hiring PhDs. In another area, I will also mention, thinking of the moments in my professional experience which have generated the most stress, that the coordination of a centre has frequent accidents along the way: dealing with a large group of contradictory wills requires patience and the capacity to promote dialogue (which sometimes becomes exhausting). Also, the effort to maintain quality, especially in view of the complexity of the periodic evaluation process, can only result from intense work in which everyone's participation must be encouraged. And let me not forget the discomfort and pain caused by increasing bureaucracy that invades the university life.

Can we say that in some way you have stimulated a school in the area of ODEs ... ?

It can be said that, in fact, I had the opportunity to pass on the taste for non-linear analysis, with some emphasis on applications in the area of ODEs, to a set of students who became researchers with recognized work and who built the core of an important team at CMAF. One of the highlights of the team's visibility was our participation in a *Human capital and mobility* project led by Prof Jean Mawhin, 1994–97. But the legacy of the scientific contributions of the group members continued to make its way. With one, irreparable, loss out of time: Miguel Ramos.

Going further back: did you always know from your first studies that you wanted to pursue a career in Mathematics?

No. I remember that towards the end of secondary school, when the service teacher gave a test on imaginary numbers, I got a *no*. I was not able to grasp anything from his lessons. A little miracle occurred when a new teacher came to replace him: she taught like someone who shines a light on words. I started getting whole tests right and then decided I wanted to study more maths. The lady's name is Maria Teresa Caldeira de Sousa (she passed away in 2018). I thus appreciated, from my own experience, that the role of the teacher in successful teaching cannot be overemphasised.

You are obviously very grateful to your teacher. Are there any other names that have weighed on your path that you would like to mention?

It would be impossible to mention all those who influenced me. The truth is that when I studied at FCUL, although the situation was incomparable to the present one, I had excellent teachers: I'll mention Santos Guerreiro, who made me discover the taste for Analysis, and Sebastião e Silva, whose last course I attended at FCUL. In the continuation of my path at FCUL, the influence of Prof. João Paulo Dias was determinant. He directed my PhD thesis and remained an invaluable advisor in many occasions, and particularly in the directive board of CMAF for several years. I should also mention Prof. Alain Haraux, whose suggestions were decisive in the choice of some themes in the initial phase of my research work.

At a certain period you also had a role in the discussions

about syllabus and teaching of mathematics at pre-university level ... what do you remember of that contribution?

The pleasant memory in that regard is my participation in REANIMAT, a program sponsored by Fundação Calouste Gulbenkian. Together with other colleagues we tried to produce a model of what a textbook should be like, and how to implement it in practical classes, without missing the official syllabus guidelines (about which we had very critical views). We aimed at coherently structured texts, conveying mathematical insight and, why not say it, the esthetical flavour of mathematics. I believe that the materials we produced have been useful to many schoolteachers: there have been requests to access those texts until the last few months. Before that, I had participated in discussions about the syllabus when changes were introduced by 1996. That was, however, a less encouraging experience.

So, as not to end on a note of regret, can you tell me the most rewarding experience you remember from your teaching activity? And in your research activity?

I have always enjoyed teaching, so it would be difficult to point out a favourite subject. If I have to, however, I will say that the course that gave me the most pleasure to organize was the course on non-linear analysis that ran when the master's degree in Mathematics was launched at FCUL. But I also taught with great pleasure, for several years, the courses of multivariable Analysis for students of Mathematics and Physics. The reception used to be always very good, which put my mind at ease about the transmission of the message.

Speaking of research, I tackled several problems in my area of interest and I have very good memories of the interaction and collaboration with colleagues from various European centres, mainly Spain, Belgium and Italy. The teamwork and the conviviality implied in it have only left me with positive impressions. In retrospect, my appreciation of my production leads me to distinguish two series of works: the study of certain 4th order models, with emphasis on heteroclinics and positivity (2003-2007) and the study of travelling waves and critical velocities for FKPP models (2004–2015). I also like to recall that the work on heteroclinics in 4th order equations arose from conversations with Henrique Leitão, then a PhD student in Physics, in the favourable environment for collaboration between physicists and mathematicians that existed in the Interdisciplinary Complex of the University of Lisbon.

You still maintain activity in the Faculty of Sciences and

in the CMAFcIO. Is life difficult without the university?

In fact, I have been supporting some optional courses in Analysis at FCUL. This has been a gratifying task because the students who enrol in those courses are among the best in their class. I also keep reading papers and thinking about problems in math, but I maintain other centres of interest. Several people had warned me about the following fact and now I know that they are right: after retirement there is not enough time to do everything we would like to. The world is too interesting, for good and for bad reasons, to allow us spare time. On the other hand, life after retirement goes on in a natural way. It has difficult moments in store for us. For some years now, I have found out that plunging into a mathematical problem, big or small, has a soothing effect regarding troubles arising in the *real world*. Be it common worries in private life or discouragement in the presence of worrying trends in our societies, when common sense seems to have become a rare commodity, a little bit of a mathematical puzzle makes it easier to withstand the discomfort.

I know that you appreciate fiction novels and many kinds of music. Do you want to share some special items where in your opinion time is well spent?

There are so many that I am unable to make a choice. I can point to two or three names whose work has been a source of pleasure for me in recent years: Balzac, Stefan Zweig and Stephen Sondheim. But let me also mention the less static joys of walking and driving, and discovering the world that has been waiting to be enjoyed: Alentejo, Extremadura, Andalucia ...

Epilogue.—The pleasant conversation went on. The excerpt registered above is a contribution to hear in the first person someone who gave, and still gives, a lot to the University, with discretion, and with the great value of dedication to Mathematics and to his students and collaborators.

As an epilogue to this interview, I would like to testify to the fruitful and friendly research environment that has always characterized the Luís Sanchez's research group, from which many people have benefited.

Having been his first PhD student, but certainly conveying the feelings of the other students and collaborators in whose path Luís Sanchez's work was important, I want to register the honour and privilege of having had him as a professor.

With all due respect, gratitude, and tenderness, from myself, as well as from your other *scientific descendants*, THANK YOU, Luís!

Short bio

Born in Lisbon, 1948. Graduated in Mathematics, University of Lisbon 1971; Ph. D., University of Lisbon, 1981 (thesis supervisor: João Paulo Dias). Professor of Mathematics at the Faculty of Sciences, University of Lisbon (1990), retired in November 2018. Member of the Editorial Board of Portugaliae Mathematica (1981–2007). Chairman of the Department of Mathematics of the University of Lisbon in 1990/91 and 1995/96. Member of the Scientific Committee of CIM (Centro Internacional de Matemática) up to 2002. Member of the Comisión Asesora Externa of IMAT (Instituto de Matemática, Univ. Santiago de Compostela), in 2018. Coordinator of Centro de Matemática e Aplicações Fundamentais (2004-2015) and Centro de Matemática, Aplicações Fundamentais e Investigação Operacional (2015-2017). Coordinator (with A. Machado) of the educational project REANIMAT sponsored by Fundação Calouste Gulbenkian — a three-year experiment in the teaching of Mathematics at high school level, 2001/2004, a contract involving FCG and FCUL.

Research interests

Boundary value problems for nonlinear ordinary differential equations; nonlinear functional analysis.

Ph. D. students

Maria do Rosário Grossinho (1988), To Fu Ma (1996), José Maria Gomes (2005), Ricardo Enguiça (2010). Also supervised master's theses of Miguel Ramos and Carlota Rebelo.

Authorship

Author or co-author of about 70 research papers. Reviewer of Mathematical Reviews and Zentralblatt für Mathematik.