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# Contributions to Nonlinear Elliptic Equations and Systems

A Tribute to Djairo Guedes de  
Figueiredo on the Occasion of his  
80th Birthday



# **Progress in Nonlinear Differential Equations and Their Applications**

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Djairo G. de Figueiredo  
Photo by Christina Figueiredo Prudencio



# Preface

The ICMC-Summer Meeting on Differential Equations is a series of meetings that takes place at the Instituto de Ciências Matemáticas e de Computação (ICMC) of the Universidade de São Paulo (USP) in São Carlos. They happen every year, since 1996, in the southern hemisphere's summer holidays, a few days before Carnival.

After the 2013 Chapter of the meeting, the local organizers decided to dedicate the next meeting to the celebration of Djairo's 80th birthday. With Djairo's blessing, the conference was arranged from the 3rd to the 7th of February, 2014, and invitations were sent out. As anyone who has ever organized a meeting knows, the hardest part is to be able to gather a large number of well-known specialists in the area, and collaborators who will help with the organization. In the case of this meeting, we must say that it was all very easy. We rapidly had a large number of worldwide experts who happily agreed to participate and a large number of collaborators who agreed to help with the several different committees. Of course, that has to do with the fact that Djairo is so well cared for in the Differential Equations community.

The 2014 Chapter was the largest edition ever of the meeting with over 300 participants from 23 different countries, 3 different continents, and from all regions of Brazil. The celebration of Djairo's 80th birthday was a very high level meeting in a relaxed and friendly environment.

Just after the meeting, we decided to write this book to record this wonderful conference. We approached Birkhäuser as publishers and they were keen to accept. In compiling this volume, we have again seen the same enthusiastic behavior that we observed during the organization of the meeting: contributors were eager to pay tribute to Djairo.

Djairo Guedes de Figueiredo was born in the small town of "Limoeiro do Norte," state of Ceará, Northeast Brazil, in 1934. He graduated in Civil Engineering from the Universidade Federal do Rio de Janeiro, in 1956. In 1961, he obtained his Ph.D. in Mathematics from the Courant Institute at NYU under the guidance of Louis Nirenberg. His professional career started in 1961 at the Universidade de Brasília, in the newly built capital of Brazil. He went back to the US from 1965 to 1971, successively at the University of Wisconsin in Madison, the University of Chicago,



the University of Maryland, and the University of Illinois at Chicago Circle. In 1971, he came back to Brazil at the Universidade de Brasília and finally moved in 1988 to UNICAMP, in Campinas, near São Paulo.

Djairo has a very active scientific life, publishing over a hundred research articles, which has made him the most cited Brazilian mathematician with almost 2500 citations in MathSciNet. His scientific contribution would be already enough to render him the dedication of a book like this one, but Djairo's contribution to Mathematics goes far beyond that. He published 29 monographs (many of them in Portuguese) that were very influential to many younger generations of Brazilian (and many other nationalities) mathematicians. His passion for mathematics has influenced entire generations of mathematicians in Brazil, South America, and throughout the world. His descendants, who include 26 Ph.D. students, are already in the fourth generation, and in four years should number 120 Ph.D.s.

It is safe to say that Djairo's influence in Brazilian mathematics made him one of the pillars of the subject in that country. He had a major influence in the development of the area of Analysis, especially in its applications to Nonlinear Elliptic Partial Differential Equations and Systems, in Brazil and throughout the world.

On a personal level, Djairo is a kind, friendly person with a great sense of humor. His natural leadership, kindness, uprightness of character, and family values are a very important part of his legacy to the younger generations.

We happily thank Djairo for the opportunity to gather together so many world-wide specialists, and for providing the bonds which brought us the family-like, high level research environment seen throughout the meeting. We are proud to be part of this small token of appreciation to Djairo's influence in our lives.

São Carlos, SP, Brazil  
 Milano, Italy  
 São Carlos, SP, Brazil  
 Brussels, Belgium  
 São Carlos, SP, Brazil  
 Paris, France  
 March 2015

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