

Celebrating 25 years of SEMA

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This special issue of the SEMA Journal is dedicated to the invaluable work carried out by the presidents of the Spanish Society of Applied Mathematics (SeMA) during its 25 years of history.

SeMA was created in 1991, following the success and continuity of the national Spanish Congresses of Differential Equations and their Applications (CEDYA) that began in 1978. Although SeMA was legally founded on February 25th 1993, there are documents reporting a meeting of the society founders in Chinchón (Madrid) in 1988. There, led by Prof. Antonio Valle, a set of about twenty mathematicians, representing most of the Spanish research groups in Applied Mathematics, decided that the XI edition of CEDYA, to be held in Málaga in 1989, would also be entitled “First Congress of Applied Mathematics” (I CMA). It was later, during the celebration of the XII CEDYA–II CMA at the Universidad de Oviedo in 1991, when more than a hundred mathematicians supported, by registering as members, the creation of SeMA as a society aiming to integrate researchers interested in Applied Mathematics living or working in Spain. By the end of 1992, the number of registered members exceeded two hundred, the first two volumes of the bulletin of the society had been published and the statutes of the society were approved.

During these 25 years, SEMA has contributed greatly to the advancement of applied mathematics in Spain by launching several wide-ranging initiatives. In addition to sponsoring the CEDYA/CMA congresses and the Spanish-French *Jacques Louis Lions* schools for graduate students, we may mention, in particular, that the scientific part of SeMA’s initial publication, the *Boletín de la Sociedad Española de Matemática Aplicada*, gave rise the SeMA Journal in 2010, and that the SeMA-SIMAI Springer Series of advanced textbooks and research monographs was launched in 2013. Both endeavors have been very successful in terms of scientific impact and international recognition and have undoubtedly contributed to increase the visibility of SeMA at the international level. We mention also the *SeMA Prize to Young Researchers*, which was established in 1998 as an award intending to recognize the scientific contributions of a young researcher, under 34, as well as to foster her/his future career. This award was renamed the *SeMA–Antonio Valle Prize to Young Researchers* in 2013, in recognition of the efforts dedicated by Prof. Antonio Valle, first president of SeMA, to the promotion of young researchers in the field of Applied Mathematics.

In the course of 25 years, SeMA has become a mature society that holds cooperation agreements and reciprocity membership with many mathematical societies. In Spain, RSME

-Royal Spanish Society of Mathematics-, SCM -Catalan Society of Mathematics, SEIO - Spanish Society of Statistics and Operational Research, AMS and SIAM in the USA, SIMAI in Italy, SMAI in France and GAMM in Germany. In addition, SeMA is a corporate member of several international mathematical organizations, such as the European Mathematical Society (EMS), the International Mathematical Union (IMU), the European Community on Computational Methods in Applied Sciences (ECCOMAS) and the Centre International de Mathématiques Pures et Appliquées (CIMPA).

For its special relevance, we highlight that SeMA is a full member of the International Council for Industrial and Applied Mathematics (ICIAM), a worldwide organization for professional applied mathematics societies, and for other societies with a significant interest in industrial or applied mathematics. The ICIAM Council sponsors the International Congresses on Industrial and Applied Mathematics, held every 4 years, which have become reference international congresses in the field of applied mathematics. At the 2013 meeting of the Board of ICIAM, SEMA won the bid to organize the ICIAM 2019 congress, setting a milestone in the history of our relatively young society. The organization of ICIAM 2019, which will be held on July 15–19, 2019 in Valencia (Spain), represents a true challenge for SeMA, as well as a recognition of the maturity of the society.

Guided by the line of events leading to the foundation of SeMA, its Executive Committee decided to create a specific committee, chaired by F. Ortégón, whose mission was to design a set of activities that would serve not only to celebrate the 25th anniversary of the society, but also to enhance its visibility as well as to recognize the many contributions of its members. The first activity took place during the 17th *Jacques-Louis Lions* Spanish-French School on Numerical Simulation in Physics and Engineering (EHF) in Gijón/Oviedo in June, 2016, and the last one during the celebration of the XXV CEDYA – XV CMA in Cartagena in June 2017.

This special issue of SeMA Journal also aims to celebrate the 25 years of existence of SEMA, and should be understood as token of appreciation to the presidents of SEMA. All of them have played an important role in the development and success of the society during these 25 years: Antonio Valle (1992–1994), Jesus Ildefonso Díaz (1994–1995), Mariano Gasca (1995–1996), Juan Luis Vázquez (1996–1998), Enrique Fernández Cara (1998–2000), Eduardo Casas (2000–2004), Juan Ignacio Montijano (2004–2006), Carlos Vázquez (2006–2010), Pablo Pedregal (2010–2012), Rafael Bru (2012–2016) and, the current president, Rosa Donat.

Special thanks are due to the five past presidents who have contributed to this special issue. Their papers provide examples of the high quality research, within different topics in Applied Mathematics, carried out within our community. J.I. Díaz extends to the multi-dimensional case some previous results for the time dependent Schrödinger equation with potentials becoming singular on the boundary of a compact set, that were already known in dimension one. The paper by E. Casas presents a review of some results on sparse controls for semilinear elliptic and parabolic partial differential equations. The contribution by M. Calvo, J.I. Montijano and L. Rández provides a new characterization of Runge–Kutta methods satisfying the so-called M-condition. The paper by M.C. Calvo-Garrido and C. Vázquez deals with the valuation of adjustable-rate mortgages with prepayment and default options, where the underlying stochastic variables are the house price and the interest rate. Finally, in the paper by P. Pedregal variational methods for the study of non-linear boundary value problems are considered.

The mission envisioned for SeMA in its early years was to contribute in a coordinated manner to the development of mathematics in connection with its applications, responding in this way to the challenge of solving problems of the real world in the most diverse areas

in science and industry. Today, as then, the activity of SeMA is based upon the consideration that mathematical modeling and analysis, numerical simulation and control theory are among the essential tools to understand and solve many new problems in science, engineering and industry. This special issue of the SeMA Journal represents an excellent example of the activity of the society and its members in the development of applied mathematics.

Rosa Donat
Universitat de Valencia
Burjassot (Spain)

Mari Paz Calvo Cabrero
Universidad de Valladolid
Valladolid (Spain)

Fernando Casas Pérez
Universitat Jaume I
Castellón (Spain)