

**THE INTERNATIONAL SYMPOSIUM ON DIFFERENTIAL MODELS  
IN GEOMETRY, COMPUTER SCIENCE AND HYDROTECHNICS,  
*DIMOGECH 2019***

**PREFACE**

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It is a great pleasure and honour to introduce this Special Issue of the **Memoirs of the Scientific Sections of the Romanian Academy**, which includes a selection of the research papers presented at the *International Symposium on Differential Models in Geometry, Computer Science and Hydrotechnics, DiMoGeCH 2019*, held May 22–25, 2019 at the Romanian Academy – Iași Branch, Romania.

The DiMoGeCH 2019 symposium was a successful scientific forum that brought together mathematicians, computer scientists and engineers, and provided a good opportunity for them to disseminate their research and exchange scientific ideas, thereby contributing to the development of the approached domains. This scientific event was organized into two main sections, corresponding to two research directions: differential geometry and computer science. It included 9 plenary lectures from leading experts in these scientific fields and 30 papers presented in parallel sessions, corresponding to the two main ones.

This special MSS issue includes some selective articles from various mathematics- and computer science-related themes, which bring important theoretical and practical results in these areas. The papers in this special issue have been peer reviewed according to journal's standards.

The first paper, entitled “Associated Metrics for Bourgeois’ Contact Forms” authored by David E. Blair, represents one of the plenary lectures of the symposium. It describes a technique for constructing some associated metrics for contact forms of the type studied by Frederic Bourgeois.

The second paper of this issue, entitled “Identities, Complete Induction Method” authored by Gabriela Constantin, presents the complete induction method, Gauss’s Identity, the method of non-determinant coefficients and recurrence relationships and Newton’s binomial.

The third article, “A Survey of Non-linear PDE-based Structural Image Interpolation Models”, authored by Tudor Barbu, describes the state of the art structural inpainting techniques based on nonlinear partial differential equations.

The fourth paper of the section, entitled “Nonlocal Reaction-diffusion Equations in Population Dynamics”, authored by Vitaly Volpert, was also presented as a plenary speech at this international symposium. It discusses some nonlocal reaction-diffusion equations, which describe various problems in ecology and biological population dynamics, and their properties.

The fifth research article, entitled “On Submanifolds of Riemannian Manifolds Admitting a Ricci Soliton”, is elaborated by Semsi Eken Meric and Erol Kilic. This paper, presented in the Differential Geometry Section of DiMoGeCH, studies the conditions under which a submanifold of a Ricci soliton is also a Ricci soliton or an almost Ricci soliton.

The sixth article, entitled “Fiber-preserving Conformal Vector Field of Frame Bundles with Natural Riemannian Metric”, authored by M. T. K. Abbassi and N. Amri, considers the bundle of all oriented orthonormal frames over an orientable Riemannian manifold and classifies the conformal vector field structure of the frame bundle with natural Riemannian metric.

The last paper of this special issue, authored by Cornelia Livia Bejan and Cem Sayar, is entitled “Generalized Skew Semi Invariant Submanifolds of Almost Paracontact Manifolds”. It describes and analyzes a special class of submanifolds in almost paracontact Riemannian manifolds corresponding to generic submanifolds in the Kählerian case and in the almost contact case.

I am extremely happy to bring out this special issue of the journal, I want to thank all those who contributed with papers and I dedicate it to all people who did their best efforts to contribute to the success of this publication.