Special Issue on Computational Differential Geometry

Editorial

It was a great pleasure to be asked by Professor Neculai Andrei to be a guest editor for this special issue of *Advanced Modeling and Optimization* which Marks 13 years of publication.

Concepts from differential geometry play a crucial role in a variety of geometry-related application areas such as geometric modeling, geometry processing, computer vision and image processing. The current focus of our research in computational differential geometry is on integral invariants, special discrete representations and the use of appropriate metrics for feature sensitive processing and computations in shape spaces.

It is the aim of this issue to be a systematic and comprehensive introduction to Riemannian and Lorentzian geometry and a representative introduction to the methods of geometric analysis. It attempts a synthesis of geometric and analytic methods in the study of Riemannian and Lorentzian manifolds.

In differential geometry, the theory of biharmonic functions is an old and rich subject. Biharmonic functions have been studied since 1862 by Maxwell and Airy to describe a mathematical model of elasticity. The theory of polyharmonic functions was developed later on, for example, by E. Almansi, T. Levi-Civita and M. Nicolescu. In the last decade there has been a growing interest in the theory of biharmonic maps which can be divided in two main research directions. On the one side, constructing the examples and classification results have become important from the differential geometric aspect. The other side is the analytic aspect from the point of view of partial differential equations.

The guest editor would like to take this opportunity to express his sincere thanks to all the authors for their contributions to this special issue, the reviewers for their valuable input, insight, and expert comments, and the Editor-in-Chief, Prof. Neculai Andrei, for his strong support in the preparation of the final presentation of putting together this special issue.

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