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## Preface

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Emmanuel Franck · Jürgen Fuhrmann ·  
Victor Michel-Dansac · Laurent Navoret

Editors

**Finite Volumes for Complex  
Applications X –  
Invited contributions;  
Elliptic and parabolic problems**

FVCA10, Strasbourg, France, October 30, 2023 – November 03, 2023

Volume 1

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## Preface

The Finite Volume method is a spatial discretization technique for partial differential equations based on the physical principle of local conservation. It has been successfully used in many applications, including fluid dynamics, magnetohydrodynamics, nuclear physics or plasma physics. Motivated by their large applicability for real-world problems, finite volumes have been the purpose of an intensive research effort in the last decades, yielding significant progress in the design, the numerical analysis, or the practical implementation of the methods.

Research on finite volumes remains very active, as problems are becoming more and more complex. Among the current challenges addressed by the scientific community, let us mention for instance the design of robust (with respect to the mesh and/or physical parameters) numerical methods, of high-order methods, of methods preserving structural properties (positivity or dissipation of a prescribed quantity), or methods enhanced by machine learning approaches.

Previous conferences in this series have been held in Rouen (1996), Duisburg (1999), Porquerolles (2002), Marrakech (2005), Aussois (2008), Prague (2011), and Berlin (2014), Lille (2017) and Bergen (2020, online).

The present volumes contain the invited and contributed papers presented as posters or talks at the 10th International Symposium on Finite Volumes for Complex Applications held at the University of Strasbourg, from October 30 to November 3, 2023.

The first volume contains the invited and contributed papers focusing on finite volume schemes for elliptic and parabolic problems. They include structure-preserving schemes, convergence proofs, and error estimates for problems governed by elliptic and parabolic partial differential equations.

The second volume is focused on finite volume methods for hyperbolic and related problems, such as methods compatible with the low Mach number limit or able to exactly preserve steady solutions, the development and analysis of high order methods, or the discretization of kinetic equations.

The volume editors thank the authors for their high-quality contributions, the members of the scientific committee for supporting the organization of the review process, and all reviewers for their thorough work on the evaluation of each of the contributions.

Finally, we warmly thank the “Cellule Congrès” of the University of Strasbourg, as well as the organizing committee for helping make this conference a great success.

Emmanuel Franck  
Jürgen Fuhrmann  
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