Mathematical and Computational Modelling of the Cardiovascular System

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ABSTRACT

Cardiovascular disease is the main cause of death worldwide. In recent years, computational models are increasingly used to simulate hemodynamics in patient-specific cardiovascular anatomies and represent a powerful tool to complement the clinical assessment of many relevant indicators in both health and disease.

In this context, many tools for cardiovascular fluid dynamics, fluid-structure interaction and uncertainty quantification have been developed to realistically simulate both high-fidelity, patient-specific and low-fidelity, patient-agnostic anatomies and physiologic boundary conditions, complementing clinical analysis for problems ranging from diagnosis to treatment and follow-up.

The main motivation of this minisymposium is to discuss recent research in the mathematics and numerics of cardiovascular modeling.

We welcome a wide range of contributions including mathematical modelling, data-driven approaches, splitting strategies for coupled problems, solver efficiency, mesh generation and management for immersed methods, uncertainty quantification, and others. We also target a variety of applications ranging from cardiac function to valve pathologies and vascular diseases. Methods specifically developed to address clinical questions are of particular interest.