Variational approaches in blood flow modeling

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Talk Abstract

The mathematical investigation of the cardiovascular system and, in particular, of blood flow in major arteries, has seen clear progress in the last three decades. Such progress allows, for the first time, to obtain 3D computational solutions which can capture important features for the understanding of the mechanical physiology of the vascular system, as well as some of its pathologies. However, the use of such simulations in clinical practice, either for diagnosis or prognosis purposes, depends on their value as patient-specific simulations. Surrogate models based on geometric multiscale couplings have been addressed by several authors. An alternative approach relies on using the so-called variational or control techniques. In this talk, we will give an overview of some of these later techniques, present numerical results, as well as some ongoing research directions.

Keywords: Navier-Stokes equations, artificial boundaries, optimal control.

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