Optimal hemodynamic control problem

Irene Marín Gayte *

Abstract

Fluid control presents great challenges. Specifically, in this case, we seek to control a fluid representing blood flow. This is particularly relevant to the understanding of some cardiovascular diseases such as an aneurysm, an arterial obstruction, etc [1]. We present some results for the case of the Navier-Stokes equations. In fact, we solve a boundary optimal control problem for the evolutionary Navier-Stokes equations with mixed Dirichlet-Neumann boundary conditions. Following previous work, [2,3], we provide additional details about the theoretical and numerical study of the solution of the boundary control problem associated with the Navier-Stokes equations under more realistic assumptions.We provide a comprehensive theoretical framework to address the analysis of the optimal control problem related to this system and the derivation of a system of first-order optimality conditions that characterizes the solution of the control problem.

References

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*Departamento de Matemática, Instituto Técnico Superior, Universidade de Lisboa. E-mail: irene.m.gayte@tecnico.ulisboa.pt