

Necessary Optimality Conditions for Optimal Control Problem Governed by 3-Dimensional Navier-Stokes Equations with Pointwise Constraints

B. T. Kien¹, A. Rösch², and D. Waschmuth³

Abstract: Based on the so-called strong solutions of the evolution Navier-Stokes equations, we derive the Pontryagin maximum principle for optimal control problems which is governed by 3D evolution Navier-Stokes equations with pointwise control constraint. In addition, we derive second-order necessary optimality conditions for the problem with pure state constraints.

¹ Institute of Mathematics, Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet Road, Hanoi, Vietnam
btkien@math.ac.vn

² Faculty of Mathematics, University of Duisburg-Essen, D-47057 Duisburg, Germany
arnd.roesch@uni-due.de

³ Institute of Mathematics, Würzburg University, Emil-Fischer-Street 30 97074 Würzburg, Germany
daniel.wachsmuth@mathematik.uni-wuerzburg.de