SEMINÁRIO DE ANÁLISE E EQUAÇÕES DIFERENCIAIS

Dia 23 de Fevereiro (quinta-feira), às 13h30, sala 6.2.33

Shape optimization for Navier-Stokes with mixed boundary conditions

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Abstract: A shape optimization problem of a pipe for the stationary Navier-Stokes equations in an industrial application is considered. The Navier-Stokes system is provided with mixed boundary conditions: Non-homogeneous Dirichlet-type on one part of the boundary (inlet and walls) and "do nothing" on the remaining part (outlet). The shape design of the duct is focused on two objectives: 1) To obtain an almost-uniform outflow, and 2) To reduce the total pressure drop of the flow. The well-posedness of the optimization problem and existence of solutions to the Navier-Stokes system are studied, and a continuous approach to the derivation of the shape gradient is presented. Details on the derivation of the numerical descent scheme and its implementation are given together with several numerical tests

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