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Solution to Shape Identification of Steady-state Viscous Flow Fields to Prescribe Flow Velocity Distribution EIJI KATAMINE, RYOMA KANAI, Department of Mechanical Engineering, Gifu National College of Technology — This paper presents a numerical solution to shape identification problem of steady-state viscous flow fields. In this study, a shape identification problem is formulated for flow velocity distribution prescribed problem, while the total dissipated energy is constrained to less than a desired value, in the viscous flow field. The square error integral between the actual flow velocity distributions and the prescribed flow velocity distributions in the prescribed sub-domains is used as the objective functional. Shape gradient of the shape identification problem is derived theoretically using the Lagrange multiplier method, adjoint variable method, and the formulae of the material derivative. Reshaping is carried out by the traction method proposed as an approach to solving shape optimization problems. The validity of proposed method is confirmed by results of 2D numerical analysis.

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