

Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Solution to shape design of unsteady natural convection fields to control time history of flow velocity EIJI KATAMINE, National Institute of Technology, Gifu College, TAKASHI AOKI, Nagaoka university of Technology — This paper presents a numerical solution to shape design of unsteady natural convection fields to control time history of flow velocity. The square error integral between the actual time history of flow velocity and the prescribed time history of flow velocity on the prescribed sub-domain during the specified period of time is used as the objective functional. Shape gradient of the shape design 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. Numerical analyses program for the shape design is developed based on FreeFem++, and the validity of proposed method is confirmed by results of 2D numerical analyses.

Eiji Katamine
National Institute of Technology, Gifu College

Date submitted: 26 Jul 2019

Electronic form version 1.4