

東北大学大学院情報科学研究科  
純粋・応用数学研究センター

第13回 幾何と解析セミナーのお知らせ

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場 所： 東北大学大学院情報科学研究科棟 6階小講義室

講演者： 中澤嵩 氏 (東北大学大学院情報科学研究科)

題 目： Shape Optimization Problems Considering Hydrodynamics Stability

[概要] The author is tackling to construct more versatile shape optimization methods controlling Hydrodynamics stability. So far, together with Prof. H. AZEGAMI, we suggested a pioneering shape optimization method by which the real part of the leading eigenvalues is defined as a cost function, and the critical Reynolds number is increased. However, the only disturbance with a maximum real part is used to evaluate the sensitivity in the method. Therefore, in the case that two and more unstable disturbances are growing up, the method is lack versatility. Wherein, the author suggest a new shape optimization method considering all the unstable disturbances.

In particular, disturbance momentum energy is defined as the cost function, and the stationary Navier-Stokes problem and the time evolution problem for non-linear disturbances are used as main problems. The shape derivative of the cost function is defined as the Fréchet derivative of the cost function with respect to arbitrary variation of the design variable, which denotes the domain variation, and is evaluated using the Lagrange multiplier method. To obtain a numerical solution, the author uses an iterative algorithm based on the H1 gradient method using the finite element method. To confirm the validity of the solution, a numerical example for two-dimensional Cavity flow is presented.

幾何と解析セミナー世話人：坂口茂，正宗淳，高橋淳也

ホームページ： <http://www.math.is.tohoku.ac.jp/~gaseminar/index.html>