機械工学セミナー
Mechanical Engineering Seminar

2019年度第7回 (No. 22)　2019-No. 7 (No. 22)

主催: 慶應義塾大学理工学部機械工学科
Department of Mechanical Engineering, Keio University

日 時 (Date):
2019年10月18日（金）(October 18, 2019 (Fri)) 17:00~18:00

場 所 (Venue):
12棟102講義室 **(Bldg. 12, Room 102) (12-102)**

講演題目 (Title):

Application of Blowing or Suction for Turbulent Flow Control on a Wing Section

講演者(Speaker):

Alexander Stroh, Dr.-Ing., Senior Scientist
Institute of Fluid Mechanics (ISTM)
Karlsruhe Institute of Technology

Abstract:

Application of Blowing or Suction for Turbulent Flow Control on a Wing Section

A. Stroh[1], G. Fahland[1], D. Gatti[1], M. Atzori[2], R. Vinuesa[2], P. Schlatter[2] and B. Frohnapfel[1]

1 *Institute of Fluid Mechanics, Karlsruhe Institute of Technology, Karlsruhe, Germany*

2 *Linné FLOW Centre, KTH Mechanics, Stockholm, Sweden*

Modification of the natural flow behaviour is one of the fundamental research topics of fluid mechanics. A series of previous investigations show a successful application of wall-normal blowing for skin friction drag reduction in zero-pressure gradient turbulent boundary layers. However, an application of such control technique on application-relevant finite-size geometry is much more complex, since pressure gradients and additional vertical forces have to be taken into account. In the present study we investigate an application of wall-normal blowing or suction on the surface of an airfoil NACA4412 at $Re_c = 2 \times 10^5$–10^7. The control effect on lift and drag of the airfoil is assessed using boundary layer theory/potential theory, RANS simulations and compared to LES and DNS simulations at lower Rec. The study shows that different configurations are beneficial at lower and higher Re-numbers, which highlights different trends in low and high range of Re. Additionally we utilize particle swarm optimization algorithm in order to find best aerodynamic efficiency for different angle of attack in a configuration with two control regions introduced on the suction and pressure side of the airfoil.

お問合せcontact: **杉浦 壽彦** Toshihiko Sugiura, E-mail: sugiura@mech.keio.ac.jp phone: 045-566-1508
深潟 康二 Koji Fukagata, E-mail: fukagata@mech.keio.ac.jp