

応用計算力学セミナー

下記のようにセミナーを開催いたします。皆様のご参加をお待ちしています。

日時：2014年7月22日（火）15:00～16:00

会場：厚生棟大会議室

申込：不要

APCOM Seminar 140722

Date and time: 22 July 2014 (Tue) 15:00-16:00

Place: Yagami Campus “Kouseito” Conference Room

Speaker: Dr. Simon J. Illingworth (University of Melbourne)

Title: Model-based feedback control of flow resonances

Abstract

Feedback flow control has been investigated for a number of unstable flows including combustion oscillations, compressible cavity resonances and vortex shedding. Many of the early studies of feedback flow control used simple phase-shift controllers that were found by trial-and-error. More recently, the application of linear control theory to fluid flows has been promoted, and there exists great scope for these techniques to be applied to flow resonances. My presentation will focus on model-based feedback control of flow resonances, with application to three systems: combustion instability on a laboratory-scale rig (a Rijke tube); compressible cavity oscillations; and vortex shedding from a circular cylinder at low Reynolds numbers. The presentation will focus in particular on finding low-order models of flow resonances that are useful for feedback control purposes. I will also demonstrate the improvements in performance (i.e. better resonance suppression) and robustness (i.e. control effectiveness over a larger range of operating conditions) that are possible when model-based control techniques are used. For all systems, in addition to demonstrating the efficacy of the feedback controllers, I will also discuss some of the challenges of control.