

國立陽明交通大學應用數學系

學術演講公告

主講人：Rajat Mittal (Johns Hopkins University)

講題：Dissecting the Causality of Pressure Forces in Vortex
Dominated Flows - From Fish Schools to Noisy Drones

時間：113 年 5 月 14 日(星期二) 下午 14:30 –15:20

地點：(光復校區) 科學一館 223 室

Abstract

Pressure-induced drag and lift are key to the performance of wings, rotors and propellers; undulating fins and flapping wings generate forces that are key to locomotion in fish, birds and insects; time-varying fluid dynamic forces drive flutter and flow-induced vibrations of flexible structures in engineering and biology, and these same forces enable the extraction of energy from flow via devices such as wind-turbines. Pressure on a body immersed in a flow is however induced simultaneously by vortices, acceleration reaction (a.k.a. added mass) effects associated with body and/or flow acceleration, and viscous diffusion of momentum, and determining the relative contribution of these different mechanisms on surface pressure remains one of the most important and fundamental issues in fluid dynamics. I will describe the force partitioning method (FPM), a new data-enabled method that partitions pressure forces into components due to vorticity, acceleration reaction and viscous diffusion. FPM has been used to gain new insights into a variety of vortex dominated flows including dynamic stall in pitching foils, vortex-induced vibration of bluff-bodies, hydrodynamics of schooling fish and rough-wall boundary layers, and results from these analyses will be presented. Application of FPM to data generated from experiments will also be described. Finally, FPM has been extended to aeroacoustics, and applications of the aeroacoustic partitioning method (APM) to dissect aeroacoustic noise in engineering and biological flows will be presented.

敬請公告 歡迎參加

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