



Πανεπιστήμιο Κύπρου
Τμήμα Μαθηματικών
και Στατιστικής

ΠΡΟΣΚΛΗΣΗ

Το Τμήμα Μαθηματικών και Στατιστικής
του Πανεπιστημίου Κύπρου
σας προσκαλεί σε ανοικτή διάλεξη,
με ομιλήτρια την

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Courant Institute of Mathematical Sciences**

με θέμα

“Membrane flutter in three- dimensional inviscid flow”

Abstract

Many previous works have studied fluid-structure interactions induced by thin flexible bodies. In most of these studies the body is nearly inextensible, with a moderate bending modulus. Here we consider softer materials — extensible membranes — that have zero bending modulus, and undergo significant stretching in a fluid flow that can lead to flutter. Examples include rubber, textile fabric, and the skin of swimming and flying animals. We develop a mathematical model and numerical method to study the large-amplitude flutter of rectangular membranes that shed a trailing vortex-sheet wake in a 3D inviscid flow. This extends our previous work on membrane dynamics in a 2D flow, where the membrane is a 1D curvilinear segment that undergoes small and large deflections. Here we consider 12 distinct boundary conditions at the membrane edges and compute the stability thresholds and the subsequent large-amplitude dynamics across the three-parameter space of membrane mass ratio, pretension, and stretching rigidity. We find that 3D dynamics in the 12 cases naturally form four groups based on the conditions at the leading and trailing edges. The conditions at the side edges are generally less important, but may have qualitative effects on the membrane dynamics — e.g. steady versus unsteady, periodic versus chaotic, or the variety of spanwise curvature distributions — depending on the group and the physical parameter values.

Η διάλεξη θα πραγματοποιηθεί την Τετάρτη 28 Ιουνίου 2023 και
ώρα 10:00, στην αίθουσα 039-ΘΕΕ01
στην Πανεπιστημιούπολη.

Η διάλεξη είναι ανοικτή στο κοινό.