SPECIAL PHYSICAL MATHEMATICS SEMINAR

TOPIC: FILAMENTS IN FLUIDS: FLUTTERING FLAGS,
FISHES AND BRIDGES

SPEAKER: MEDERIC ARGENTINA
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ABSTRACT:

We give an explanation for the onset of wind-induced flutter in a flag. Our theory accounts for the various physical mechanisms at work: the finite length and the small but finite bending stiffness of the flag, the unsteadiness of the flow, the added mass effect and vortex shedding from the trailing edge. Our analysis allows us to predict a critical speed for the onset of flapping as well as the frequency of flapping. We find that in a particular limit corresponding to a low-density fluid flowing over a soft high-density flag, the flapping instability is akin to a resonance between the mode of oscillation of a rigid pivoted airfoil in a flow and a hinged-free elastic filament vibrating in its lowest mode. Our model is then adapted in order to provide insights on the problem of fish locomotion.

FRIDAY, APRIL 9, 2004
2:30 pm
Building 2, Room 338

Refreshments will be served at 3:30 PM in Room 2-349

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