Distinguished Lectures

Department of Mathematics
香港城市大學
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DEPARTMENT OF MATHEMATICS

City University of Hong Kong

Capillary Gravity Water Waves Linearized at Monotone Shear Flows: Eigenvalues and Inviscid Damping

by

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Date: 10 March 2022 (Thursday)
Time: 10:00 am – 11:00 am

ABSTRACT

We consider the 2-dim capillary gravity water wave problem -- the free boundary problem of the Euler equation with gravity and surface tension -- of finite depth $x_2 \in (-h,0)$ linearized at a uniformly monotonic shear flow $U(x_2)$. Our main focus are eigenvalue distribution and inviscid damping. We first prove that in contrast to finite channel flow and gravity waves, the linearized capillary gravity wave has two unbounded branches of eigenvalues for high wave numbers. They may bifurcate into unstable eigenvalues through a rather degenerate bifurcation. Under certain conditions, we provide a complete picture of the eigenvalue distribution. Assuming there are no singular modes (i.e. embedded eigenvalues), we obtain the linear inviscid damping. We also identify the leading asymptotic terms of velocity and obtain stronger decay for the remainders. This is a joint work with Xiao Liu.

Registration URL:
https://cityu.zoom.us/meeting/register/tJIudu6pqTMvGtL2ZfXCi4fQi0N_a5A9SU1Y

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