



The Institute of Mathematical Sciences
The Chinese University of Hong Kong

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IMS PDE Seminar

Asymptotic Analysis of Steady Viscous Shocks in a 1-D Finite Nozzle in the Small Viscosity Limit

Abstract: In this talk, I will report our recent results on asymptotic behaviors of steady viscous 1-D shock solutions in a finite nozzle in the small viscosity limit. It is well-known from the viewpoint of inviscid flows that for a given supersonic state at the entrance of the nozzle, there exist infinite transonic shock solutions with the same state behind the shock front, while the position of the shock front could be arbitrary in the nozzle. In this talk, we are going to investigate the asymptotic behaviors of the viscous shock solutions for the steady 1-D Navier-Stokes system as the coefficient of the viscosity goes to zero. It will be shown that the viscous shock solutions converge under the L^1 norm as the viscosity coefficient goes to zero. Moreover, the position of the shock front for the limit shock solution can also be obtained. However, the positions may be different under different assumptions for the viscosity. This shows interesting phenomena which raise further problems to be studied. This talk is based on joint works with Qin Zhao, with Su Jiang and Piye Sun, as well as with Ya-Guang Wang.

By

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Date	: July 9, 2025 (Wednesday)
Time	: 10:30am – 11:30am
Venue	: Room 501a, Academic Building No. 1, CUHK

All are Welcome