



Department of Mathematics
The Chinese University of Hong Kong

數學系
香港中文大學

Phone: (852) 3943 7988 / 3943 7989 • Fax: (852) 2603 5154 • Email: dept@math.cuhk.edu.hk
Rm. 220, Lady Shaw Building, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong

M.Phil. Thesis Defense

The Steady Boltzmann Equation with an Inhomogeneous Source

Mr. Hongru CHEN

Department of Mathematics, The Chinese University of Hong Kong

Abstract:

In this thesis, we investigate the steady Boltzmann equation with an inhomogeneous source on torus. Existence, uniqueness and hydrodynamic limit is considered. To obtain the existence, we employ an a priori estimate via L^2 - L^∞ framework. The essential is to show higher integrability of the macroscopic part. One approach is to estimate the L^6 bound of fluid part with proper test functions constructed by the elliptic theory. Once done, uniform a priori estimates in ϵ are provided, which implies the existence of steady solutions as well as the hydrodynamic limit. Another difficulty is to achieve the positivity of steady solutions with physical (nonnegative) source. We approach this result by studying the dynamic stability. In other words, some estimates of time exponentially decay are established for the unsteady Boltzmann equation with initial data as steady solutions combining small perturbation.

Date: 10 July 2018 (Tuesday)

Time: 9:30 a.m. – 10:30 a.m.

Venue: Room 222, Lady Shaw Building

The Chinese University of Hong Kong, Shatin

All are Welcome!