

# 國立交通大學應用數學系

## 學術演講公告

主講人：陸冰滢 博士(中央研究院 數學所)

講題：Universality of semi-classical sine-Gordon equation,  
inverse scattering transform and Riemann–Hilbert problem

時間：108 年 4 月 9 日(星期二) 下午 14:00 –15:00

地點：(光復校區) 科學一館 223 室

茶會：當天下午 1:30 (科學一館 205 室)

### Abstract

Starting from the 1970s with the KdV equation, scientists have realized there is a very special class of nonlinear equations that are “integrable”. Those equations are closely related to the soliton theory, and their solutions exhibit surprising structures. Since then people have developed various methods to tackle the inverse scattering transform (IST) for the integrable non-linear equations (it wouldn’t hurt to think of it as an analogue of Fourier transform for the linear equations). In early 1990s, Deift and Zhou found a matrix steepest descent method for the Riemann–Hilbert problems associated with the IST. Comparing to previous approaches, this method enables us to study the solutions with more precision and analytical rigor.

Our study of universality of the semi-classical sine-Gordon equation is one such example. It is a case study for a more general open conjecture on universality made by Dubrovin. et, al.. For a large class of initial conditions, a dispersively-regularized shock forms in finite time. We are able to characterize the asymptotics near a certain gradient catastrophe. More surprisingly, our results are universal, in the sense that the solution profile is independent of the initial condition.

(based on joint work with Peter Miller)

敬請公告 歡迎參加

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