慶應義塾大学 21世紀COEプログラム
「統合数理科学：現象解明を通した数学の発展」

Integrative Mathematical Sciences 統合数理科学

Keio University

# Pathways Lecture Series in Mathematics, KEIO


Speaker : **Prof. Chuu-Lian Terng**
(University of California, Irvine)


Place : Room 14-203, 2nd Floor, Bldg. 14
Faculty of Science and Technology
Yagami Campus, KEIO University

## Lecture 1 16:30 ～ 18:00 October 29, 2007 (Monday)

***Introduction to soliton equations.***

I will give a brief history of early developments of soliton equations in applied math, partial differential equations, and differential geometry, and explain some remarkable properties of these equations. I also plan to use 3D-XplorMath computer program to demonstrate soliton interactions, numerical solutions, and show some surfaces in differential geometry whose governing equations are soliton equations.

## Lecture 2 16:30 ～ 18:00 October 30, 2007 (Tuesday)

***Soliton equations and loop algebras***

Most soliton equations can be constructed from splittings of subalgebras of loop algebras. Moreover, we can use the splitting to explain in a unified way B\"acklund transformations, scattering, inverse scattering, bi-Hamiltonian structures, tau functions, and Virasoro actions for soliton equatioins.

## Lecture 3 16:30 ～ 18:00 November 1, 2007 (Thursday)

***The Space-time Monopole Equation***

The space-time monopole equation is a dimension reduction of the self-dual Yang-Mills equation, and is a soliton equation in two space and one time dimensions. I will explain how to use techniques from soliton theory to construct soliton solutions and solve the Cauchy problem. I will also show Quicktime movies of soliton interactions.


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