Integrable Systems Seminar:

CH EQUATION

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9 November, 2009: 3pm–4pm
MAGC 1.410

Abstract:
This is the 1st one of the two talks for the CH series. My presentation is based on our previous work (see references below). I will show how a peaked soliton (peakon) is derived from the CH equation. Actually, all possible explicit single soliton solutions of the CH equation can be obtained under the boundary condition u ? A (A is a constant) as x??. Regular peakon solutions correspond to the case of A = 0. For the case of A is not 0, both new peakons and new type of smooth solitons, which are expressed in terms of trigonometric and hyperbolic functions, are given through investigating a Newton equation with a new potential. We also prove that the constructed cusp soliton and smooth soliton are weak solutions in distribution sense. If time is allowed, I will also mention that the CH multi-peakon system is a finite-dimensional integrable system in the Louville sense and parlicularly, two peakons system can be explicitly solved.

References: ***Zhijun Qiao* with Guoping Zhang (2006): On peaked and smooth solitons for the Camassa-Holm equation, *Europhys. Lett.* , 73, 657 663. ***Zhijun Qiao *with Guoping Zhang and Fengshan Liu (2008): Cusp and Smooth Solitons of the Camassa-Holm Equation under an Inhomogeneous Boundary Condition, *Pacific Journal of Applied Mathematics* 1(1), 113 130.