



Analysis Seminar

Semi-periodic Problems for Nonlinear Integrable Evolution Equations

By

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Abstract: In this talk we present the solvability of a semi-periodic problem for the well known Kadomtsev–Petviashvili (KP) equation. Specifically, we consider the Cauchy problem on the cylinder $(S^1 \times \mathbb{R})$ for the KP-II equation, with one temporal (t) and two spatial (x, y) independent variables, with periodicity in the x -direction and decay in the y -direction. Since this equation possesses a Lax pair, the method of the inverse spectral transform is being used. For initial data with small L^1 and L^2 norms (and assuming the zero mass constraint), the initial-value problem is reduced to a Riemann–Hilbert problem with shift on the boundary of certain infinite strips in the complex plane of the spectral parameter. Both the direct and inverse spectral problems are being rigorously solved and we prove that the initial-value problem has a unique solution for all non-negative time t , uniformly bounded for all t in $L^2(S^1 \times \mathbb{R})$, by assuming that the initial data have small derivatives up to 8th order in the space $L^1(S^1 \times \mathbb{R}) \cap L^2(S^1 \times \mathbb{R})$.

Date: Monday, April 29, 2024

Time: 15:30-16:30

Place: SA141 - Mathematics Seminar Room