ICTS Seminar

Title : The stability of solutions of integrable equations

Speaker : Bernard Deconinck, University of Washington, USA

Date : Wednesday, October 25, 2017

Time : 11:00 AM

Venue : Madhava Lecture Hall, ICTS Campus, Bangalore

Abstract : Examining the stability of solutions of nonlinear PDEs continues to be an active area of research. Very few instances lend themselves to explicit results for even spectral and linear stability, let alone orbital (nonlinear) stability. Using the Lax pair structure of integrable equations, much progress has been made recently on the stability or instability of solutions of integrable problems.

After introducing the necessary concepts, I will discuss our recent work on the stability of standing wave solutions of the focusing NLS equation. The spectral stability of these solutions was completely characterized recently. The crux of this characterization was the analysis of the non-self adjoint Lax pair for the focusing NLS equation. Although all solutions are unstable in the class of bounded perturbations, different solutions were found to be spectrally stable with respect to certain classes of periodic perturbations, with period an integer multiple of the solution period. We prove that all solutions that are spectrally stable are also (nonlinearly) orbitally stable, using different Krein signature calculations. Similar, more recent results for the sine-Gordon equation will be shown as well.