

Calderón-Zygmund Analysis Seminar

Monday, May 17th, 3:45 pm

Nonlinear PDEs with potentials, harmonic analysis, and the stability of kinks

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Abstract. We present some recent results on nonlinear evolution equations with external potentials, and applications to the asymptotic stability of kinks (the simplest example of topological solitons). Linearizing around these objects leads to the study of nonlinear equations with large external potentials and low power nonlinearities. Classical methods do not seem to be able to address the question of asymptotic behavior and scattering for these models. We propose a method based on the use of the distorted Fourier transform (the Fourier transform adapted to the Schrodinger operator) and the development of multilinear harmonic analysis in this context, and present recent progress on some open problems in the field. We also provide the first result on the full asymptotic stability of kinks for classical 1d field theories. If time permits we will also discuss some recent results for nonlinear Schrodinger and Klein-Gordon equations in three dimensions.