

GRADUATE STUDENT SEMINAR

Guest Speaker: Alex Himonas

University of Notre Dame

Date: Thursday, February 10, 2022

Time: 2:00 PM

Location: 125 Hayes-Healy Hall

Zoom URL: notredame.zoom.us/j/93888654312



Lecture Title:

Analysis of the Korteweg-de Vries (KdV) equation

Abstract

The KdV equation is one of the most ubiquitous models in mathematics and physics. It was first derived by Boussinesq in 1877 in his effort to demystify Russell's observation of what he called the "great wave of translation" in a Union Canal near Edinburgh in 1834. Korteweg and de Vries rediscovered the KdV equation in 1895 and confirmed that it has traveling wave solutions (solitons). The solving of the KdV initial value problem, with nice data, was initiated by Gardner, Greene, Kruskal, and Miura in 1967 by recognizing its remarkable integrability properties. Its solving for rough (L^2) data was accomplished by Bourgain in 1993 using novel ideas from classical and harmonic analysis. In 1996, Kenig, Ponce, and Vega advanced these ideas and solved the KdV with data of regularity below L^2 . It is interesting that these ideas are also needed if one studies KdV solutions with the nicest possible data (analytic). In this talk we will try to present the key points of this remarkable KdV story.