Boğaziçi
MATH GRAD SEMINAR

Strichartz and Kato estimates for the KdV equation

Oğuz Yılmaz

Boğaziçi University

Abstract:

The Kato and Strichartz estimates play a significant role in understanding the behavior of the Korteweg-de Vries (KdV) equation. These estimates quantify how solutions disperse and smooth out over time. In simpler terms, they show that even if the initial disturbance is irregular, the dispersive nature of the KdV equation forces the solution to become more regular as time passes. This smoothing effect is crucial for proving that solutions to the KdV equation exist, are unique, and behave predictably, a property known as well-posedness. Moreover, Strichartz estimates provide powerful integrability bounds that capture how the solution's energy spreads in space and time, while Kato estimates specifically illustrate the balance between nonlinearity and dispersion.

This talk aims to present the derivation of these estimates using tools from functional and Fourier analysis.

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