



WVU MATHEMATICS COLLOQUIUM

Solving the Korteweg-de Vries Equation

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4:30pm - 5:20pm, Virtual

In this talk we shall discuss the initial value problem of a higher dispersion Korteweg-deVries equation with data in Sobolev spaces. After some historical remarks about the significance of these equations in the theory of water waves and integrability, we shall recall some early results about its well-posedness in various solution spaces. Then, we shall introduce the Bourgain spaces and the bilinear estimates required for obtaining optimal well-posedness results using modern harmonic analysis techniques. Finally, we will conclude by stating a recent result on the initial-boundary value problem of these equations.

To attend virtually, please send a request to Dr. Ela Celikbas or Dr. Krzysztof Ciesielski.

References

- [1] J. Bourgain, *Fourier transform restriction phenomena for certain lattice subsets and applications to nonlinear evolution equations. Part 2: KdV equation*. *Geom. Funct. Anal.* **3** (1993), 209–262.
- [2] R. Figuera, A. A. Himonas, and F. Yan, *A higher dispersion KdV equation on the line*. *Nonlinear Anal.* **199** (2020), 112055, 38.
- [3] C. Kenig, G. Ponce and L. Vega, *A bilinear estimate with applications to the KdV equation*. *J. Amer. Math. Soc.* **9** (1996), no. 2, 573–603.
- [4] F. Yan, *Well-posedness of a higher dispersion KdV equation on the half-line*. *Journal of Mathematical Physics* **61** (2020), no. 8, 081506.