SEMINÁRIO DE EQUAÇÕES DIFERENCIAIS

Bilinear Strichartz estimates for the Zakharov-Kuznetsov equation and applications

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Resumo: This talk is concerned with the Zakharov-Kuznetsov equation

$$(0.1) \qquad \partial_t u + \partial_x \Delta u + u \partial_x u = 0.$$

We prove that the associated initial value problem is locally well-posed in $H^s(\mathbb{R}^2)$ for $s > \frac{1}{2}$ and globally well-posed in $H^1(\mathbb{R} \times \mathbb{T})$ and in $H^s(\mathbb{R}^3)$ for $s > 1$. Our main new ingredient is a bilinear Strichartz estimate in the context of Bourgain's spaces which allows to control the high-low frequency interactions appearing in the nonlinearity of (0.1). In the $\mathbb{R}^2$ case, we also need to use a recent result by Carbery, Kenig and Ziesler on sharp Strichartz estimates for homogeneous dispersive operators. Finally, to prove the global well-posedness result in $\mathbb{R}^3$, we use the atomic spaces introduced by Koch and Tataru.

This talk is based on a joint work with Luc Molinet.