On special regularity properties of solutions to the k-generalized Korteweg-de Vries equation

Felipe Linares
IMPA, Rio de Janeiro
`linares@impa.br`

We will discuss special regularity properties of solutions to the IVP associated to the k-generalized KdV equations. In [1] we show that for data $u_0 \in H^{3/4+}(\mathbb{R})$ whose restriction belongs to $H^k((b,\infty))$ for some $k \in \mathbb{Z}^+$ and $b \in \mathbb{R}$, the restriction of the corresponding solution $u(\cdot,t)$ belongs to $H^k((\beta,\infty))$ for any $\beta \in \mathbb{R}$ and any $t \in (0,T)$. Thus, this type of regularity propagates with infinite speed to its left as time evolves. This kind of regularity can be extended to a general class of nonlinear dispersive equations.

Recently, in [2] we proved that the solution flow of the k-generalized KdV equation does not preserve other kind of regularities exhibited by the initial data u_0.

References

[1] P. Isaza, F. Linares, and G. Ponce, *On the propagation of regularity and decay of solutions to the k-generalized Kortweg-de Vries equation*, Comm. Partial Diff. Eqs. **40** (2015), 1336–1364.

[2] F. Linares, G. Ponce, and D. Smith, *On the regularity of solutions to a class of nonlinear dispersive equations*, preprint.